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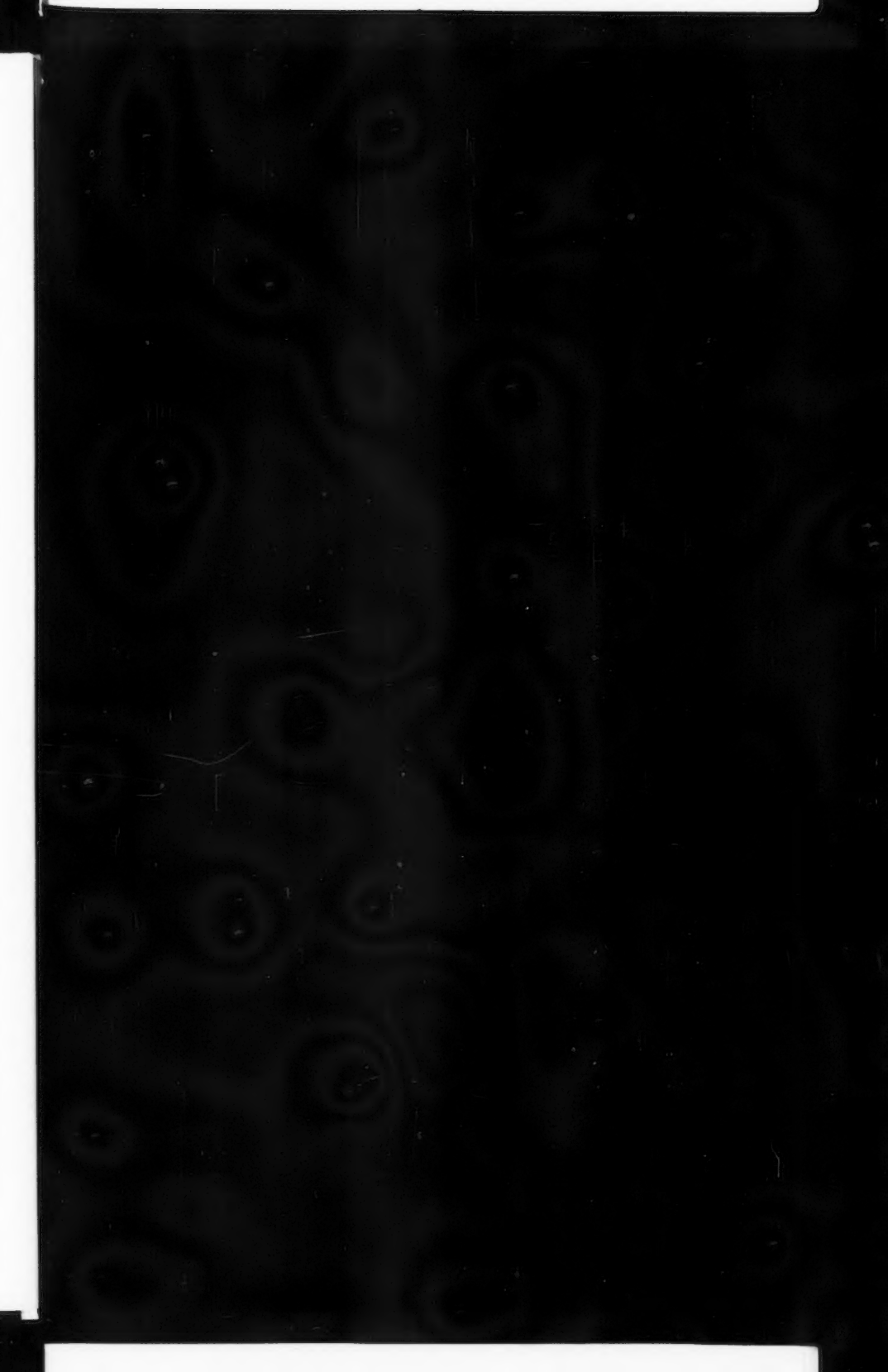

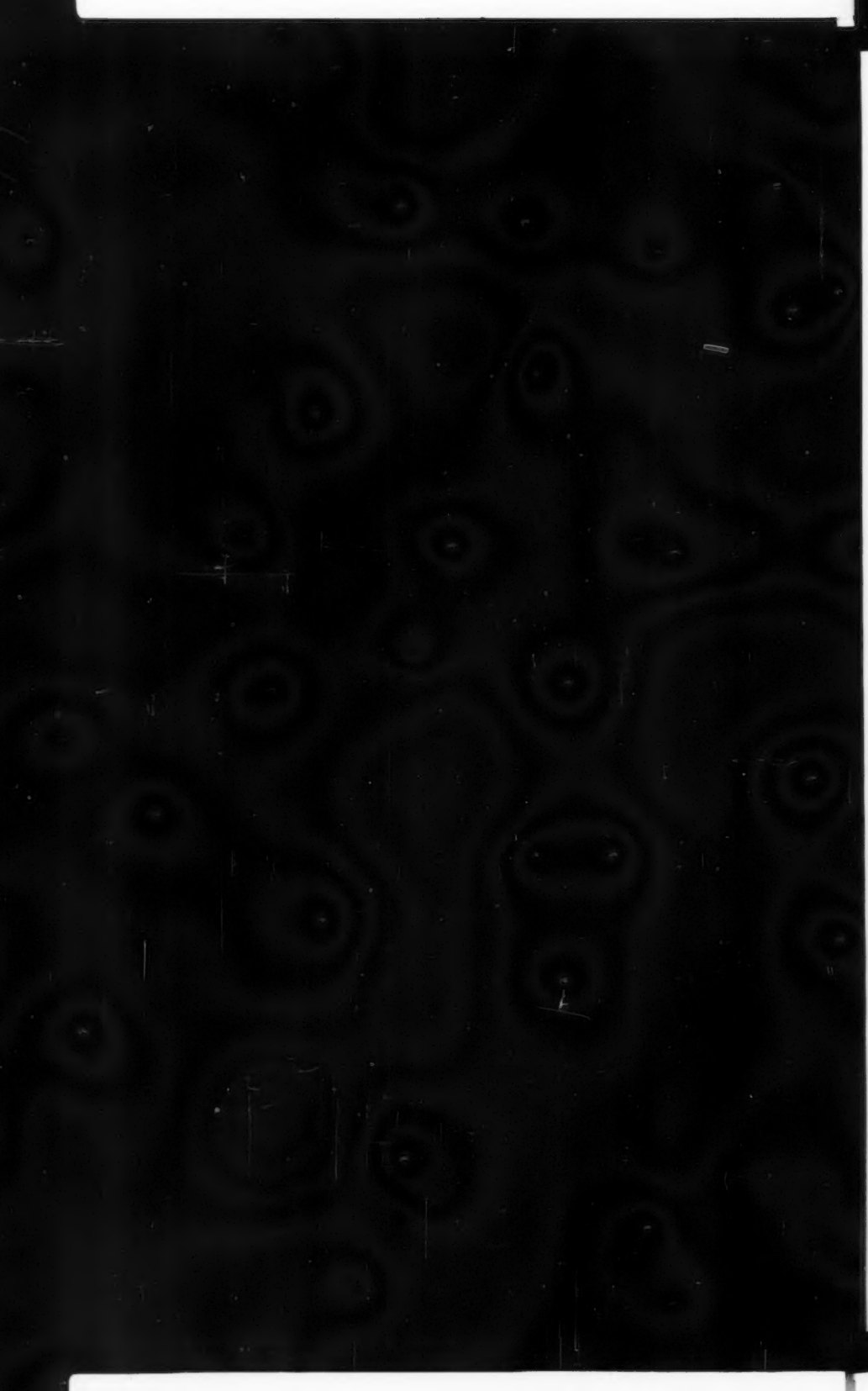

BIRD-BANDING

A JOURNAL OF ORNITHOLOGICAL INVESTIGATION

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THE FUNCTION OF SEXUAL FIGHTING IN BIRDS; AND THE PROBLEM OF THE ORIGIN OF "TERRITORY"

BY N. TINBERGEN

THE problem of the function of "territory" originated as the problem of the function of fighting of male birds in spring. This question was first raised by Darwin. It was Darwin who concluded that the fighting of male birds in spring was "over the females", and that a female would choose a strong and victorious male in preference to a weak male to mate with. Doubtless this hypothesis was originally intended to interpret the *function* of the fighting, not to serve as a psychological interpretation of the motives of the fighting males. Owing to the position of psychology at that time, Darwin's formulation, and perhaps his conclusion itself, were not so cautious as to be particular on this point.

Howard's theory of the "territorial" function of the fighting was in some respects a reaction from the Darwinistic explanation. It became impossible to assume that the males fought "over the females" because the fighting begins when the females are still absent. This, it should be noted, is a psychological argument. Territory, however, is present from the beginning of the battles, and therefore Howard(1), seeing a correlation between fighting and "settling on a territory", concluded that fighting was "for territories."[1] In the course of his argument Howard passes from a psychological to a functional interpretation, and considers the securing of a territory to be the only function of fighting. It is my opinion, that considering the function of fighting, the new interpretation is just as incomplete as the former one.

Psychologically speaking, that is, seeking for the motives of the fighting bird, and for the circumstances which stimulate and direct its fighting, both formulations are uncritically expressed, and it is therefore difficult to discuss them. What is "fighting for" something? The expression "fighting for" or "fighting over" implies a hypothesis about the state of a bird's mind which has failed as a basis for the interpretation of many facts of bird behavior known

[1] "The males do not fight over the females; they fight for territory." M. M. Nice in: Fifty Years Progress of American Ornithology. 1933.

at present. When no special psychological background is accepted, the expression ought to be more sharply defined; otherwise it is too vague a term to permit discussion.

As Howard's hypothesis tries to explain the function of fighting, and a satisfactory formulation has not yet been found (many facts do not fit in with Howard's scheme), another formulation about the function of the fighting will be discussed here. Therefore it will be necessary to discuss fighting first, in order not to focus attention on territory at once. It is the fighting that is the observed fact: territory as a function of fighting is the hypothesis.

That the attention was concentrated on the defense of a territory as the only, or at least the main, function of the fighting, is largely due to the fact that comparison, which is so important an aid for functional interpretation, was restricted to birds only, and even to rather few kinds of birds. It is, however, necessary to compare bird-behavior with corresponding behavior among other animals. It is seen, then, that there occurs much fighting between members of one sex in many kinds of animals, culminating in the period of the formation of pairs. It is this kind of fighting which reaches its maximum intensity before and during mating, that was considered by Howard. That he did not sufficiently exclude the defending of nest and young against predatory animals, has been emphasized by Lack (2), with whose criticism I quite agree, so far as this point is concerned.

Before considering the function of special cases of fighting, it is necessary to agree on the way to determine it. The function of a process must be judged by the effect it has. Now the fighting in spring is never fighting under all circumstances but it is always spatially restricted; that is to say, fighting is restricted to the vicinity of something. The animal does not merely fight; it remains at the same time in the neighborhood of something, and along this line "defense" originates. When we see that the fighting is always exhibited in the presence of some particular object, then it is undeniable that the fighting has the effect of assuring the possession of that object and we conclude that the fighting has the function of assuring its possession for the fighting animal.

Now when we find evidence of fighting outside the territory, or even independent of the presence of a territory, we cannot assume it to be a case of fighting for territory. We are not able to see its function in assuring of territory. In a comparative review of fighting behavior before or during pairing (which I will call "sexual fighting"), many instances appear in which fighting is not restricted to territory, and is even independent of territory. The latter case is, so far as I know, not known among birds; and an explanation of this curious fact will be given farther on. The former case, however, of fighting which is not restricted to territory, does indeed occur.

In some species of birds, fighting is not restricted to a special

territory, but also occurs at many places outside it. Instances are the Great Crested Grebe, Huxley (3); the Avocet, Makkink (in MS.).

Secondly, in most "territorial" birds, it often happens that a male that has settled on a territory fights outside of it under special circumstances. One of these is that a female, having no idea of the borders of the territory of its mate (which is often the case), goes outside it. Sometimes the male will follow her into strange territory. Here they will be attacked by the owners of that territory, and then the male will fight the strange male. This he will never do as long as both of them are unmated. In other cases an unpaired male crosses its own borders to visit the female of its neighbor. Upon being attacked by the latter, he will often fight; if there is no female, he will not fight, but will flee. Instances of both cases are reported by Howard himself; furthermore, I have observed several instances in the Snow Bunting.[2] Here the males fight in presence of the female while temporarily deserting the territory.

Thirdly, in many species the females also fight. Now, in the Snow Bunting, the female does not know the borders of the male's territory, and often trespasses outside of them; Brock (6) describes the same occurrence among Willow Wrens. Nevertheless, the female Snow Buntings fight furiously. They attack almost exclusively other females.[3] The females fight only in the presence of the males. The function of this fighting of the females, therefore, cannot be sought in the defense of territory alone, for it results in securing a mate, as they do not allow another female to come near the male. To a certain degree, however, their fighting helps in defending the territory, because the females remain in the neighborhood of their mates, and these remain in their territories.

Territory alone fails to explain these instances of fighting. Fighting before and during mating occurs, as remarked above, in many species of animals besides birds. Some few instances will be mentioned.

A very interesting instance is the fresh-water fish *Rhodeus amarus*, a species which lays eggs in the gills of the mussel *Anodonta cygnæa*. In the spring the male settles in the neighborhood of a mussel, and fights furiously against other males of the same species, thereby actually "defending" this mussel and remaining in its immediate vicinity. It does not matter that the mussel is constantly moving about; the fish is connected with it and not with a certain topo-

[2] The Snow Bunting, which I had opportunity to study intensively, is a strictly territorial bird, notwithstanding the opinion of Mrs. Nice (4), which was based on the observations of Nicholson (5). Nicholson's observations were made at the end of the reproductive season, on individuals which were collecting food for their young. In this stage many birds collect food outside their territories, in places where they seldom fight.

[3] Howard, defending his view on the function of fighting, calls attention to the fact that not only males fight males, but pairs fight against pairs, and argues that the function of those latter fights cannot be anything else than defending the territory. In the Snow Bunting, all fights between pairs are in reality double fights, one of male against male and another of female against female. This makes a considerable difference!

graphically limited area, Wunder (7). It is impossible to speak of territory here, as the area covered constantly changes.

The sexual fights of many Ungulates, of which the Moose (*Alces alces*) will be taken as an example, is not connected with territory. The fighting of the male Moose is restricted to the vicinity of his herd of females and is independent of the actual place in which they stay at the moment of the encounter. The area in which he attacks a strange male, and which moves about with the females, is much smaller than the ground they are moving about in in the pairing season. Although the latter is also a rather limited area, it is not a territory in the sense of Howard's concept, *as it is not defended*. Here we feel the lack of that strict definition which Howard has failed to give. Farther on a definition will be discussed.

These few instances will suffice to show that fighting in the pairing season has not always the effect of securing a territory. In the two cases mentioned above, there is a connection with other things (mussel, female) only; in the case of the birds there is a connection with territory, and *a connection with the sex partner besides*.

Another method by which we can trace objectively the function of fighting is to look for common characters in all individuals that are attacked by the fighting bird; for the attacked birds are competitors in some respect.

Here, however, one restriction must be made. The fighting bird has, without any doubt, an inborn disposition to react on special kinds of birds by driving them off. This disposition reacts on the visual stimulation, as birds recognize other birds in the first place by sight. We can expect, therefore, reactions on birds which are not competitors, but which are "mistaken" for the real competitor, owing to optical resemblance. Such "errors" are known to every field observer, not specially in the case of fighting birds, but more often in the case of the discrimination of a bird of prey (for which Swifts and Pigeons are often taken by birds), or of the discrimination of parent birds by young, etc.

The same may apply to auditory orientation, although I cannot now cite any instances.

Applying this method and looking for common characters in the attacked birds, we find puzzling facts which do not exactly fit in with the scheme of birds defending territories alone. For instance, in the great majority of species, males fight against males, and females against females. As territory-competitors, for a male, strange females are as bad as strange males.

By comparative observation we find in various species a great many different objects "defended" against competitors. We conclude that an object is "defended" when we see the fighting restricted to its vicinity. *It is well to emphasize that our knowledge of these objects is no hypothesis, but a fact.* When we consider these objects, they all appear to have one character in common: they are, without

any exception, necessary for the successful accomplishment of reproduction. *The fighting before and during the formation of sexual bonds, therefore, serves to secure objects or situations which are indispensable for reproduction.* A closer definition cannot be given without excluding many facts known.

This situation is different for different species, according to their ecological needs. In most birds, territory is included as one element in this situation, as a consequence of their laying in a certain place, eggs which have to be incubated in that same place. In most birds, the sex partner is another element of the situation. In the Moose, the sex partner is the only element. In *Rhodeus*, the mussel is one element, the female another one.

Let us now consider the case of birds more closely.

In many species, as was remarked above, the females do a certain amount of fighting. This occurs especially in monogamous species. The fighting of these females may be, as it is the case in the Snow Bunting, and certainly in many other species too, independent of territory, and dependent on the sex partner only. In the Snow Bunting, it is indirectly connected with territory: the female remains in the vicinity of the male, leaving him for short excursions only, and as the male remains in his territory, the female remains there too. The fighting of the females, and, less exclusively, the fighting of the males, here serves as a means of establishing monogamy, and monogamy is biologically most important in connection with the rearing of young.

A definition of "territory" is necessary when it has to be discussed. Howard does not give a definition, and many of his critics have also forgotten to define it; and as the meaning of the word "territory" in daily life is much wider than in Howard's discussion, the word has been applied to many territories of quite another kind. It will appear from what I have said that in my opinion *we must define "territory" as an area which is defended by a fighting bird shortly before and during the formation of a sexual bond.* This definition does not differ essentially from Ernst Mayr's definition, which runs: "Territory is an area occupied by one male of a species which it defends against intrusions of other males of the same species and in which it makes itself conspicuous."(8). I have two objections to Mayr's definition: First, in some species, it is the female that secures territory (Phalarope), Tinbergen (9) and second, no reference is made to the fact that the territory is established shortly before and during mating, though Mayr expresses this indirectly by a reference to some courtship actions by which the birds make themselves conspicuous. This behavior runs parallel with the mating behavior, and it appears, therefore, that no essential differences exist between both formulations; I consider my formulation to be the more direct, and therefore prefer it to Mayr's.

A territory in this sense (which is certainly identical with the

"territory" Howard had in mind) occurs in many more species of birds than is recognized. In their criticism of Howard, the Lacks speak of "colonial birds" as opposed to "territorial birds." This is based on observations of Bertram and Lack on Guillemots, which are observed "to brood each other's eggs and young indiscriminately." (10). This, however, does not imply, that "territory" does not exist among Guillemots, but only that the orientation of the Guillemot is such as to make errors possible. I suppose, judging from comparable observations on Terns, that a Guillemot which is incubating on a wrong nest will defend this nest against trespassers, because it considers the egg which it is incubating as its own. My own observations on a colonial bird, the Herring Gull, show that every pair has a strictly defined territory which is defended against other Herring Gulls, especially by the male, but to a certain degree by the female also. Males fight with males principally, and females with females. In Terns the case is nearly identical; every pair has a territory around its nest. In Huxley's film of the Gannet, incubating birds are seen pecking at trespassers which come too near the nest; fights between neighbors seem to occur regularly. *A colonial bird may be just as territorial as a solitary bird.*

The territory that plays a part in the sexual life of birds is by no means of the same importance and significance in different species. It remains one of Howard's many merits, that he has clearly shown that the value of the territory in one species of bird is very different from that in other species. That he could not give more than tentative suggestions was due to a lack of knowledge about the ecological needs of most birds, a lack of knowledge which still exists in nearly the same degree. Still, careful observation has made a rough analysis possible in some cases. In the Grey Heron, for instance, the territory is a place where a nest can be built, Verwey (11); a territory of a Kestrel is a place where a nest is present, L. Tinbergen (12); in Howard's Buntings, as well as in the Snow Bunting, the territory must contain not only a nesting-site, but surely something more, and the question of the food for the young certainly is of importance, though it is yet impossible to see its exact value.

Although, in the case of birds, the area in which the nest will be built is always included in the "defended situation," it is quite possible that the sex partner in some species is a more important element than the territory. Such a state could be recognised by the greater amount of "free fighting," of fighting occurring outside the territory but in the presence of the sex partner. In the Snow Bunting, and doubtless in many other truly territorial species, those "free fights" are rare, and the bird always shows much hesitation before it crosses its own boundaries to follow its mate (which, having no knowledge of these boundaries, often crosses them) and fights outside the territory.

In other birds, the concentration of the fights within the limits of the territory is much less complete, as for instance in the Northern or Red-necked Phalarope (where the female does the fighting) and, according to Huxley (13) in the Black-tailed Godwit. In other species, again, it apparently is difficult to discover any connection between fighting and territory at all; this connection I believe to be questionable in the Great Crested Grebs, Huxley (3) and in the Avocet, Makkink (in MS.). This can be concluded, as was explained above, from the great number of free fights. The result in these cases is a rather vaguely defined territory. That a territory results at all is caused by the fact that the bird concentrates its activities around a certain topographical center (the place of the future nest). The difference with the strictly territorial species, which do so likewise, is that in the latter no strange bird of the same species and sex is tolerated within the area in which the bird fights, whereas in the former it is not so much the fact that the strange bird is on the territory which urges the attacking bird to fight as that the strange bird comes, for instance, into the vicinity of the female. It is, therefore, *a priori* possible that such an ill-defined territory contains no essential factor for reproduction, but that it is an unessential by-product. To find these cases, however, the available methods seem to be inadequate.

The fact that the significance of "territory" as the function of the sexual fighting in birds has been overemphasized has several reasons. Firstly, the origin of the territory theory as a reaction from the Darwinistic interpretation caused an over emphasis on the other side. Secondly, the function of the fighting in many species of birds is really the securing of a territory in the first place, for a reason which has been pointed out above. Thirdly, the situation in many birds shows a complication; though the fighting shows functional connection with the sex partner, it may begin when the latter is still absent. But as the female is attracted only by a male in full sexual condition, and a male in full sexual condition has a territory, a territory is, to the male, a "potential female;" it is absolutely the same (functionally), if a female is present in the territory at once, or if it will be present after some time. Howard's objection to the Darwinistic interpretation was a psychological one: he could not assume that the males could be induced to fight for something absent. The functional connection between fighting and the sex partner here takes a roundabout way. Owing to a bird's living in the present and not in the future, such a roundabout way is psychologically impossible. After the arrival of the female, however, the behavior of the male shows, not only the functional, but also the psychological connection with the female, as he is stimulated by her presence to fight in places where he would otherwise withdraw.

To summarize: It is argued that the problem of territory is in origin the question of the function of sexual fighting, that is,

fighting shortly before and during the formation of sexual bonds. Objections are made to the overemphasizing of territory as the function of sexual fighting. The fighting does not occur in the presence of the territory only, but in several cases in the presence of the sex partner, which is "defended" in much the same way. Further comparison with other animals shows, that sexual fighting may often occur without any connection with territory. In birds, this does not occur, owing to the fact that birds lay eggs which have to be incubated at one and the same spot; therefore fighting, if occurring at all, has always a connection with territory.[4] In general, it must be said that the sexual fighting in all animals serves to secure one or more objects or situations which are necessary for reproduction. These objects are generally a territory and a sex partner. In the case of many female birds, the object is primarily the sex partner; in most cases of male birds territory and sex partner both are included. When both sexes fight, monogamy is promoted, which is of great importance to the rearing of the young.

It has not been my intention to write an elaborate treatise on the subject, though this certainly would be necessary to fill up many gaps; my intention has been only to point out several causes for the unsatisfactory formulation of the actual problem about "territory." It is caused by a vague formulation of the original question, by the lack of definitions of discussed concepts, and by the fact that the problem has drifted away from the function of fighting to the meaning of territory.

Zoölogical Laboratory, Leiden, Holland.

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[4] It is possible that, in birds which pair before settling on a territory, sexual fighting occurs only in the flock, and then misses the connection with territory. I know of no instance which has been studied satisfactorily.

A LIST OF EXTERNAL PARASITES FROM BIRDS OF THE EASTERN PART OF THE UNITED STATES

BY HAROLD S. PETERS[1]

DURING the past eight years a special study has been made of the distribution of the various external parasites found on the birds of the United States. Most of the material has been collected by the members of our staff, although many records have been sent to us by bird-banders, naturalists, and other persons interested in the subject. A number of very interesting records have been found, and many new host and distribution records have been accumulated. Most of the records obtained have been from birds in the States east of the Mississippi River. In order to make these data available to other workers this paper has been prepared.

There are here recorded 198 different species of external parasites from 255 species and subspecies of wild birds from various States east of the Mississippi River during the years from 1928 to 1935 inclusive. The external parasites considered here are the Mallophaga or biting lice, the Hippoboscidæ or bird-flies, the mites, and the ticks. Only records from the files of the Bureau of Entomology and Plant Quarantine are included, no attempt having been made to complete the list by compiling records from other collections or published data. Previous lists of Mallophaga have been published which may be consulted for additional data (see list of references). Owing to the large number of birds listed and the limits of time and space, it was necessary to confine the distribution data to the States in which each species of parasite was collected.

I want to take this opportunity to thank the many persons who have sent material to us for helping to gather the information here presented. I wish also to acknowledge the valuable assistance of the specialists who identified the material recorded in this list. The flies were determined by the late Dr. J. M. Aldrich of the United States National Museum and by Dr. J. Bequaert of Harvard University Medical School, the mites by Dr. H. E. Ewing of the Bureau of Entomology and Plant Quarantine, and the ticks by Dr. F. C. Bishopp and Mr. C. N. Smith of the same bureau. The Mallophaga were all determined by the author.

There are some birds from which few kinds of parasites have been obtained. Other birds were found to harbor many species; such were the Bob-white, Song Sparrow, and Robin, from each of which fifteen species of parasites are listed. There are some species of birds found in the region considered in this paper from which no parasites

[1] Mr. Peters, formerly Assistant Entomologist, Division of Insects Affecting Man and Animals, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, Washington, D. C., from 1928 to 1935, is now Associate Biologist, Bureau of Biological Survey, Auburn, Alabama, since October 24, 1935. *The Editor.*

have been secured. Of course not every individual bird of a single species is found with all of the parasites listed, but if enough individuals of each bird species are studied from different localities a more complete understanding of the parasite fauna is obtained. I believe it is possible for every kind of bird to have at least three kinds of lice, one or two hippoboscids, and several mites, and that those birds feeding or alighting on the ground may carry one or more kinds of ticks. More field collecting and more interest on the part of persons handling birds, such as bird-banders, would greatly increase our knowledge of this subject. It is hoped that other workers will be able to fill gaps in this list and to record parasites from species of birds not included here.

It will be noticed that there are many records of the finding of the same species of parasite on a number of different kinds of birds. This may be due, first, to the fact that the parasite is naturally widely distributed or, second, to the fact that insufficient study has been given to differentiating variations in the parasite that might be sufficient to establish new species or varieties. An example of the first case is the common rabbit tick, *Hæmaphysalis leporis-palustris*, the most widely distributed parasite found in this study, which is recorded from 46 birds in this list. An example of the second case is the louse *Philopterus subflavescens*, recorded from 42 birds. Careful study by a taxonomist having a large series of this louse at hand should result in the separation of a number of new species or varieties. Among the Hippoboscidæ, or bird-flies, there are two species widely distributed on passerine birds—*Ornithoica confluenta*, recorded on 27 species, and *Ornithomyia anchineuria*, recorded on 32 species. The northern fowl mite, *Liponyssus sylviarum*, was found on 22 species. This illustrates the danger of distribution of economic pests by our wild birds, as well as the danger of disease-transmission by those parasites feeding on blood.

In the following list the birds are arranged in the order of the fourth edition (1931) of the American Ornithologists' Union Check-List. The lice are indicated by (L), the bird flies by (F), the mites by (M), and the ticks by (T). Distribution is shown by abbreviations of the States in which specimens were collected.

Common Loon, *Gavia immer immer* (Brünnich).
(L) *Philopterus graviceps* (Kell.), N. H.
Horned Grebe, *Colymbus auritus* (L.).
(L) *Degeeriella americana* (Kell. & Chap.), Ill.
(L) *Esthiopterum luridum* (Nitz.), Ill.
(L) *Pseudomenopon pacificum* (Kell.), Ill.
Cory's Shearwater, *Puffinus diomedea borealis* Cory.
(L) *Naubates diversum* (Kell.), Mass.
(L) *Philopterus* sp., Mass.
Atlantic Fulmar, *Fulmarus glacialis glacialis* (L.).
(L) *Esthiopterum nigrolimbatum* (Giebel), Mass.
Eastern Brown Pelican, *Pelecanus occidentalis occidentalis* L.
(L) *Esthiopterum forficulatum* (Nitzsch), Fla.
(L) *Ferrisia unciferum* (Kell.), Fla.
(L) *Tetrophthalmus titan* Piaget, Ala., Fla.

Gannet, *Moris bassana* (L.).
(L) *Pectinopygus bassanæ* Fabr., Me.
Double-crested Cormorant, *Phalacrocorax auritus auritus* (Lesson).
(L) *Amyrsidea kuwani* (Kell. & Chap.), Ga., Ill.
(L) *Esthiopterum toxocerum* (Nitzsch), Ga., Ill., N. H.
Florida Cormorant, *Phalacrocorax auritus floridanus* (Audubon).
(L) *Esthiopterum toxocerum* (Nitzsch), Fla.
Great Blue Heron, *Ardea occidentalis* Audubon.
(L) *Colpocephalum laticeps* (Kell.), Ala., Ohio.
American Egret, *Casmerodius albus egretta* (Gmelin).
(L) *Colpocephalum laticeps* (Kell.), Pa., Va.
(L) *Esthiopterum botauri* (Osborn), Pa.
(F) *Lynchia americana* Leach, Pa.
(F) *Lynchia botaurinorum* Swenk, N. H.
Snowy Egret, *Egretta thula thula* (Molina).
(L) *Colpocephalum laticeps* Kell., S. C.
(F) *Lynchia botaurinorum* Swenk, S. C.
Louisiana Heron, *Hydranassa tricolor ruficollis* (Gosse).
(L) *Colpocephalum laticeps* Kell., S. C., Va.
Little Blue Heron, *Florida cærulea cærulea* (L.).
(L) *Colpocephalum laticeps* Kell., N. C., N. H., S. C.
(F) *Lynchia ardeæ* Mcq., Ala.
Black-crowned Night Heron, *Nycticorax nycticorax hoactli* (Gmelin).
(L) *Colpocephalum laticeps* Kell., D. C.
(F) *Lynchia albipennis* Say, Ohio.
American Bittern, *Botaurus lentiginosus* (Montagu).
(L) *Esthiopterum botauri* (Osb.), Ala., N. H.
(L) *Pseudomenopon pacificum* (Kell.), La.
(L) *Rallicola bisetosa* (Piaget), La.
(F) *Lynchia botaurinorum* Swenk, Ohio.
Eastern Least Bittern, *Ixobrychus exilis exilis* (Gmelin).
(L) *Pseudomenopon pacificum* (Kell.), La.
(L) *Rallicola bisetosa* (Piaget), La.
(M) *Trombicula irritans* (Riley), La.
Wood Ibis, *Mycteria americana* L.
(L) *Ferrisia femorata* (Piaget), Fla.
White Ibis, *Guara alba* (L).
(L) *Ibidæcus* sp., Fla., Ga.
Whistling Swan, *Cygnus columbianus* (Ord.)
(L) *Menopon* sp., N. C.
(L) *Trinoton anserinum* (Fabr.), Md., N. C., Pa.
Common Canada Goose, *Branta canadensis canadensis* (L).
(L) *Anatæous dentatus* (Scopoli), Ga.
(L) *Ornithobius goniopleurus* Denny, Ga., N. H.
(L) *Trinoton querquedulæ* (L), Ga.
American Brant, *Branta bernicla hrota* (Muller).
(L) *Esthiopterum crassicorne* (Scopoli), N. H.
Lesser Snow Goose, *Chen hyperborea hyperborea* (Pallas).
(L) *Anatæcus dentatus* (Scopoli), Mich.
(L) *Anatæcus obtusus* (Giebel), Mich.
(L) *Trinoton querquedulæ* (L.), Mich.
Greater Snow Goose, *Chen hyperborea atlantica* Kennard.
(L) *Anatæcus dentatus* (Scopoli), Va.
(L) *Esthiopterum anseris* (L.), S. C., Va.
Blue Goose, *Chen cærulescens* (L.).
(L) *Anatæcus dentatus* (Scopoli), Ga.
(L) *Trinoton querquedulæ* (L.), Ga.
Common Mallard, *Anas platyrhynchos platyrhynchos* L.
(L) *Trinoton querquedulæ* (L), Mich., S. C.

Common Black Duck, *Anas rubripes tristis* Brewster.
(L) *Anatœcus dentatus* (Scopoli), Md., N. H., N. Y., S. C.
(L) *Esthiopterum crassicorne* (Scopoli), N. H., N. Y., S. C.
(L) *Trinoton querquedulæ* (L.), Md., N. H., S. C.
Gadwall, *Chaulelasmus streperus* (L.).
(L) *Anatœcus dentatus* (Scopoli), Mass.
(L) *Esthiopterum crassicorne* (Scopoli), Mass., S. C.
(L) *Trinoton querquedulæ* (L.), Mass., S. C.
Baldpate, *Mareca americana* (Gmelin).
(L) *Esthiopterum crassicorne* (Scopoli), N. H.
(L) *Trinoton querquedulæ* (L.), Va.
American Pintail, *Dafila acuta tzitzihoa* (Vieillot).
(L) *Anatœcus dentatus* (Scopoli), S. C.
(L) *Esthiopterum crassicorne* (Scopoli), La., Mass., S. C.
(L) *Trinoton querquedulæ* (L.), La., S. C.
Green-winged Teal, *Nettion carolinense* (Gmelin).
(L) *Esthiopterum crassicorne* (Scopoli), N. H.
(L) *Trinoton querquedulæ* (L.), N. H.
Blue-winged Teal, *Querquedula discors* (L.).
(L) *Esthiopterum crassicorne* (Scopoli), N. H.
(L) *Trinoton querquedulæ* (L.), N. H., S. C.
Shoveller, *Spatula clypeata* (L.).
(L) *Esthiopterum crassicorne* (Scopoli), S. C.
Wood Duck, *Aix sponsa* (L.).
(L) *Anatœcus dentatus* (Scopoli), N. H.
(L) *Esthiopterum crassicorne* (Scopoli), N. H.
(L) *Holomenopon loomisii* (Kell.), N. H.
Ring-necked Duck, *Nyroca collaris* (Donovan).
(L) *Anatœcus dentatus* (Scopoli), Ala., S. C.
(L) *Esthiopterum crassicorne* (Scopoli), Ala., S. C.
(L) *Trinoton querquedulæ* (L.), Ala., S. C.
Lesser Scaup Duck, *Nyroca affinis* (Eyton).
(L) *Anatœcus dentatus* (Scopoli), Ala., N. H.
(L) *Esthiopterum crassicorne* (Scopoli), Ala., N. H., N. C.
(L) *Trinoton querquedulæ* (L.), Ala.
American Golden-eye, *Glaucionetta clangula americana* (Bonaparte).
(L) *Trinoton querquedulæ* (L.), Mass.
Buffle-head, *Charitonetta albeola* (L.).
(L) *Esthiopterum crassicorne* (Scopoli), N. H., S. C.
(L) *Trinoton querquedulæ* (L.), S. C.
Old-squaw, *Clangula hyemalis* (L.).
(L) *Anatœcus dentatus* (Scopoli), N. H.
(L) *Esthiopterum crassicorne* (Scopoli), N. H.
American Eider, *Somateria mollissima dresseri* Sharpe.
(L) *Anatœcus dentatus* (Scopoli), Mass.
(L) *Anatœcus obtusus* (Giebel), Mass.
White-winged Scoter, *Melanitta deglandi* (Bonaparte).
(L) *Esthiopterum crassicorne* (Scopoli), N. H.
Ruddy Duck, *Erismatura jamaicensis rubida* (Wilson).
(L) *Anatœcus dentatus* (Scopoli), Ala.
Red-breasted Merganser, *Mergus serrator* L.
(L) *Anatœcus dentatus* (Scopoli), Ala., N. H.
(L) *Anatœcus ferrugineus* (Giebel), Ala.
(L) *Esthiopterum crassicorne* (Scopoli), Ala., N. H.
(L) *Trinoton querquedulæ* (L.), Fla., Mass.
Turkey Vulture, *Cathartes aura septentrionalis* Wied.
(L) *Esthiopterum marginale* (Osborn), Fla.
(L) *Ferrisia kelloggi* (Osborn), Ill.
(L) *Læmobothrion glutinans* Nitzsch, Fla., N. C.
(M) *Eupterolichus* sp., Fla.
(M) *Liponyssus bursa* (Berlese), Fla.

Black Vulture, *Coragyps atratus atratus* (Meyer).
(L) *Cuculiphilus alternatum* (Osborn), Ala., Fla.
(L) *Esthiopterum marginale* (Osborn), Ala.
(L) *Ferrisia kelloggi* (Osborn), Ala.
(L) *Læmobothrion glutinans* Nitzsch, Fla.
Eastern Goshawk, *Astur atricapillus atricapillus* (Wilson).
(L) *Colpocephalum flavescens* Nitzsch, Mass.
(L) *Philopterus taurocephalus* (Kell.), Mass., Pa.
(F) *Lynchia americana* Leach, Pa.
Sharp-shinned Hawk, *Accipiter velox velox* (Wilson).
(L) *Colpocephalum flavescens* Nitzsch, Ala.
(L) *Degeeriella fusca* (Nitzsch), Md., N. H.
(L) *Philopterus taurocephalus* (Kell.), Ala., S. C.
(F) *Lynchia americana* Leach, Ohio, S. C.
(F) *Lynchia wolcotti* Swenk, Mich.
Cooper's Hawk, *Accipiter cooperi* (Bonaparte).
(L) *Colpocephalum flavescens* Nitzsch, Va.
(L) *Philopterus taurocephalus* (Kell.), S. C.
(F) *Lynchia americana* Leach, Md., Ohio.
(M) *Neonyssus* sp., Md.
Eastern Red-tailed Hawk, *Buteo borealis borealis* (Gmelin).
(L) *Colpocephalum flavescens* Nitzsch, Fla., Ga., Ohio, S. C.
(L) *Degeeriella fusca* (Nitzsch), Me., N. H., S. C.
(L) *Philopterus taurocephalus* (Kell.), N. H., Pa., S. C.
(F) *Lynchia americana* Leach, N. C., Ohio
Northern Red-shouldered Hawk, *Buteo lineatus lineatus* (Gmelin).
(L) *Colpocephalum flavescens* Nitzsch, Pa.
(L) *Philopterus taurocephalus* (Kell.), Md., N. H., Pa.
(F) *Lynchia americana* Leach, Pa.
Florida Red-shouldered Hawk, *Buteo lineatus alleni* Ridgway.
(L) *Degeeriella fusca* (Nitzsch), Fla., S. C.
(L) *Philopterus taurocephalus* (Kell.), Fla.
(F) *Lynchia americana* Leach, Ala., Ga.
Broad-winged Hawk, *Buteo platypterus platypterus* (Vieillot).
(L) *Degeeriella fusca* (Nitzsch), Md.
American Rough-legged Hawk, *Buteo lagopus s. johannis* (Gmelin).
(L) *Degeeriella fusca* (Nitzsch), N. H.
(L) *Philopterus taurocephalus* (Kell.), N. H.
(L) *Colpocephalum flavescens* Nitzsch, Mass., N. H.
Golden Eagle, *Aquila chrysaëtos canadensis* (L.).
(L) *Philopterus halieti* (Osborn), S. C.
(F) *Lynchia americana* Leach, S. C.
Southern Bald Eagle, *Haliæëtus leucocephalus leucocephalus* (L.).
(L) *Degeeriella amblys* (Kell.), D. C.
(L) *Ferrisia osborni* (Kell.), Ala., D. C., Mass., Va.
(L) *Læmobothrion titan* Piaget, Ohio, Va.
(L) *Philopterus halieti* (Osborn), Ala., D. C.
Marsh Hawk, *Circus hudsonius* (L.).
(L) *Colpocephalum flavescens* Nitzsch, Ala.
(L) *Degeeriella fusca* (Nitzsch), Ala., N. H., Pa., S. C.
(L) *Philopterus taurocephalus* (Kell.), N. H.
(F) *Lynchia americana* Leach, S. C.
Osprey, *Pandion haliaëtus carolinensis* (Gmelin).
(L) *Kurodaia haliaëti* (Denny), Fla., S. C.
(F) *Olfersia fossulata* Meq., Va.
Duck Hawk, *Falco peregrinus anatum* Bonaparte.
(L) *Colpocephalum flavescens* Nitzsch, Ill., N. H., S. C.
(L) *Degeeriella fusca* (Nitzsch), N. H., S. C.
(F) *Lynchia americana* Leach, S. C.

Eastern Pigeon Hawk, *Falco columbarius columbarius* L.
(L) *Degeeriella fusca* (Nitzsch), Mich.
(F) *Ornithoctona nebulosa* Say, Md.
Eastern Sparrow Hawk, *Falco sparverius sparverius* L.
(L) *Degeeriella fusca* (Nitzsch), N. H., N. Y., S. C.
(T) *Amblyomma americanum* (L.), Fla.
Eastern Ruffed Grouse, *Bonasa umbellus umbellus* (L.)
(L) *Lipeurus perplexus* (Kell. & Chap.), N. Y., Pa.
(L) *Goniocotes* sp., Mass.
(F) *Lynchia americana* Leach, N. H.
(T) *Hæmaphysalis leporis-palustris* Packard, Mass., Me., Mich., N. H., R. I.
Greater Prairie Chicken, *Tympanuchus cupido americanus* (Reichenbach).
(L) *Menopon monostæchum* Kell., Wis.
(T) *Hæmaphysalis leporis-palustris* Packard, Wis.
Prairie Sharp-tailed Grouse, *Pediœcetes phasianellus campestris* Ridgway.
(L) *Goniodes mammillatus* Rudow, Wis.
(T) *Hæmaphysalis leporis-palustris* Packard, Wis.
European Partridge, *Perdix perdix perdix* (L.).
(L) *Goniodes mammillatus* Rudow, Ohio.
Eastern Bob-white, *Colinus virginianus virginianus* (L.)
(L) *Esthiopterum clavatus* (McGregor), Md., Pa., Va.
(L) *Esthiopterum dovei* (McGregor), Ohio.
(L) *Goniodes ortygis* Denny, Md., N. C., Ohio, S. C., Va.
(L) *Lipeurus aberrans* McGregor, Md., Ohio, S. C.
(L) *Liperus dissimilis* Piaget, Va.
(L) *Menacanthus* sp., Md., Ohio, Va.
(F) *Ornithomyia anchineuria* Speiser, Pa.
(M) *Atricholælaps* sp., N. C.
(M) *Hæmogamassus* sp., N. C.
(M) *Megninia* sp., Ohio.
(M) *Neoschöngastia americana* (Hirst), Va.
(T) *Amblyomma americanum* (L.), Ga., Md.
(T) *Amblyomma maculatum* Koch, Ga.
(T) *Hæmaphysalis leporis-palustris* Packard, Fla., Ga., N. C., S. C., Tenn., Va.
(T) *Ixodes diversifossus* Neumann, Md.
Ring-necked Pheasant, *Phasianus colchicus torquatus* Gmelin.
(L) *Lipeurus introductus* Kell., N. J.
(L) *Menopon monostæchum* Kell., N. H., N. J.
Reeves Pheasant,
(L) *Menopon monostæchum* Kell., Pa.
Limpkin, *Aramus pictus pictus* (Meyer).
(L) *Eulæmobothrion cubense* (Kell. & Ferris), Fla.
(L) *Ibidæcus* sp., Fla.
King Rail, *Rallus elegans elegans* Audubon.
(L) *Pseudomenopon pacificum* (Kell.), Ala., La.
(L) *Rallicola bisetosa* (Piaget), Ala., La.
Wayne's Clapper Rail, *Rallus longirostris waynei* Brewster.
(L) *Pseudomenopon pacificum* (Kell.), S. C.
(L) *Rallicola bisetosa* (Piaget), S. C.
Louisiana Clapper Rail, *Rallus longirostris saturatus* Ridgway.
(L) *Pseudomenopon pacificum* (Kell.), La.
(L) *Rallicola bisetosa* (Piaget), La.
Virginia Rail, *Rallus limicola limicola* Vieillot.
(L) *Pseudomenopon pacificum* (Kell.), S. C.
(F) *Lynchia* sp., Mass.
Sora, *Porzana carolina* (L.).
(L) *Esthiopterum comstocki* (Kell. & Chap.), S. C.
(L) *Pseudomenopon pacificum* (Kell.), S. C.
(T) *Amblyomma americanum* (L.), S. C.

Florida Gallinule, *Gallinula chloropus cachinnans* Bangs.
(L) *Incidifrons pertusus* (Nitzsch), S. C.
(L) *Pseudomenopon pacificum* (Kell.), D. C., N. J.
(L) *Rallicola bisetosa* (Piaget), S. C.
American Coot, *Fulica americana americana* Gmelin.
(L) *Eulæmobothrion nigrum* (Burmeister), N. C.
(L) *Incidifrons pertusus* (Nitzsch), Ill., N. C., S. C.
(L) *Pseudomenopon pacificum* (Kell.), Ill., La., N. C., S. C.
(L) *Rallicola advena* (Kell.), D. C., La., S. C.
American Oyster-catcher, *Hæmatopus palliatus palliatus* Temminck.
(L) *Actornithophilus grandiceps* (Piaget), Ga.
Piping Plover, *Charadrius melodus* Ord.
(L) *Degeeriella opaca* (Kell. & Chap.), Ga.
Cuban Snowy Plover, *Charadrius nivosus tenuirostris* (Lawrence).
(L) *Degeeriella* sp., Fla.
(L) *Philopterus* sp., Fla.
Semipalmated Plover, *Charadrius semipalmatus* Bonaparte.
(L) *Actornithophilus* sp., Ohio.
(L) *Degeeriella opaca* (Kell. & Chap.), Mass., N. H., Ohio, S. C.
(L) *Philopterus conicus* (Denny), Mass., S. C.
Wilson's Plover, *Pagolla wilsonia wilsonia* (Ord.).
(L) *Degeeriella opaca* (Kell. & Chap.), Fla., Mass., S. C.
Killdeer, *Oxyechus vociferus vociferus* (L.).
(L) *Actornithophilus xgialitidis* (Durrant), Ala., La., N. H., S. C., Va.
American Golden Plover, *Pluvialis dominica dominica* (Müller).
(L) *Actornithophilus timidus* (Kell.), Ga.
(L) *Philopterus conicus* (Denny), Mass., N. H., S. C.
Black-bellied Plover, *Squatarola squatarola* (L.).
(L) *Actornithophilus timidus* (Kell.), Ill., S. C.
(L) *Philopterus conicus* (Denny), Mass., N. H.
Ruddy Turnstone, *Arenaria interpres morinella* (L.).
(L) *Actornithophilus* sp., Fla.
(L) *Degeeriella* sp., Fla., N. H., S. C.
American Woodcock, *Philohela minor* (Gmelin).
(T) *Dermacentor nigrolineatus* Packard, Wis.
Wilson's Snipe, *Capella delicata* (Ord.).
(L) *Degeeriella magnocephala* (Carriker), Md., N. H.
(L) *Philopterus major* (Waterston), Del.
Long-billed Curlew, *Numenius americanus americanus* Bechstein.
(L) *Cummingsiella testudinaira* (Denny), Ga.
(L) *Degeeriella* sp., Ga.
(L) *Philopterus humeralis* (Denny), Ga.
Hudsonian Curlew, *Phæopus hudsonicus* (Latham).
(L) *Degeeriella* sp., S. C.
(L) *Philopterus humeralis* (Denny), Fla., Mass., S. C.
Spotted Sandpiper, *Actitis macularia* (L.).
(L) *Degeeriella rava* (Kell.), Md.
Greater Yellow-legs, *Totanus melanoleucus* (Gmelin).
(L) *Actornithophilus* sp., La., N. H., S. C.
(L) *Degeeriella austini* Peters, D. C., La., Mass.
(L) *Philopterus* sp., D. C., La.
Lesser Yellow-legs, *Totanus flavipes* (Gmelin).
(L) *Actornithophilus* sp., Md., S. C.
(L) *Degeeriella falcigera* Peters, D. C., La., N. H., Md., S. C.
(L) *Philopterus* sp., Ga., S. C.
American Knot, *Calidris canutus rufus* (Wilson).
(L) *Actornithophilus* sp., Fla.
(L) *Degeeriella actophila* (Kell. & Chap.), Fla.
(L) *Degeeriella complexiva* (Kell. & Chap.), Fla.
(L) *Philopterus* sp., Fla.

Pectoral Sandpiper, *Pisobia melanotos* (Vieillot).
(L) *Actornithophilus pustulosus* (Piaget), Va.
(L) *Degeeriella complexiva* (Kell. & Chap.), Va., S. C.
White-rumped Sandpiper, *Pisobia fuscicollis* (Vieillot).
(L) *Actornithophilus minus* (Kell. & Chap.), Mass., S. C.
(L) *Degeeriella actophila* (Kell. & Chap.), Mass.
(L) *Degeeriella complexiva* (Kell. & Chap.), Mass., Ohio.
Baird's Sandpiper, *Pisobia bairdi* (Coues).
(L) *Degeeriella complexiva* (Kell. & Chap.), Mass., Ohio.
Least Sandpiper, *Pisobia minutilla* (Vieillot).
(L) *Actornithophilus* sp., D. C., Fla., La.
(L) *Degeeriella actophila* (Kell. & Chap.), La., S. C.
(L) *Degeeriella complexiva* (Kell. & Chap.), D. C., S. C.
Red-backed Sandpiper, *Pelidna alpina sakhalina* (Vieillot).
(L) *Actornithophilus minus* (Kell. & Chap.), Fla., Mass., S. C.
(L) *Degeeriella actophila* (Kell. & Chap.), Fla., Mass., S. C.
(L) *Degeeriella complexiva* (Kell. & Chap.), Fla., Mass., S. C.
(L) *Philopterus* sp., Mass., N. H., S. C.
(M) *Sommatericola* sp., S. C.
Eastern Dowitcher, *Limnodromus griseus griseus* (Gmelin).
(L) *Actornithophilus uniforme* (Kell.), Fla., Ga., S. C.
(L) *Degeeriella* sp., Fla.
(L) *Philopterus* sp., Fla., Mass., N. H., S. C.
Stilt Sandpiper, *Micropalma himantopus* (Bonaparte).
(L) *Actornithophilus* sp., Ohio.
Semipalmated Sandpiper, *Ereunetes pusillus* (L.).
(L) *Actornithophilus* sp., S. C.
(L) *Degeeriella actophila* (Kell. & Chap.), S. C.
(L) *Degeeriella complexiva* (Kell. & Chap.), S. C.
Western Sandpiper, *Ereunetes mauri* Cabanis.
(L) *Actornithophilus* sp., Va.
(L) *Degeeriella actophila* (Kell & Chap.), Fla., S. C.
(L) *Degeeriella complexiva* (Kell. & Chap.), Fla., S. C.
(L) *Philopterus* sp., Fla.
Marbled Godwit, *Limosa fedoa* (L.).
(L) *Actornithophilus timidus* (Kell.), Ga., S. C.
(L) *Degeeriella cordata* (Osborn), Ga., S. C.
Sanderling, *Crocethia alba* (Pallas).
(L) *Actornithophilus spinulosum* (Piaget), Mass., S. C.
(L) *Degeeriella actophila* (Kell. & Chap.), Ill., Mass., Ohio, S. C., Va.
(L) *Degeeriella complexiva* (Kell. & Chap.), Fla., Ill., Mass., N. H., Ohio, S. C., Va.
(L) *Philopterus* sp., S. C.
Avocet, *Recurvirostra americana* Gmelin.
(L) *Degeeriella decipiens* (Nitzsch), Ga.
(L) *Degeeriella testudinaria* (Children), Ga.
Northern Phalarope, *Lobipes lobatus* (L.).
(L) *Degeeriella connexa* (Kell. & Mann), Ohio.
Parasitic Jaeger, *Stercorarius parasiticus* (L.).
(L) *Esthiopterum modestum* (Giebel), Mass.
(L) *Menopon infrequens* Kell., Mass.
(L) *Philopterus pustulosus* (Nitzsch), Mass.
Glaucous Gull, *Larus hyperboreus* Gunnerus.
(L) *Philopterus gonothorax* (Giebel), Ga.
Great Black-backed Gull, *Larus marinus* L.
(L) *Actornithophilus funebre* (Kell.), Mass.
(L) *Degeeriella ornata* (Grube), Mass.
(L) *Philopterus gonothorax* (Giebel), Mass., N. H.
Herring Gull, *Larus argentatus smithsonianus* Coues.
(L) *Actornithophilus funebre* (Kell.), Fla., La., S. C.

(L) *Degeeriella ornata* (Grube), Fla., La., S. C.
(L) *Menopon* sp., S. C.
(L) *Philopterus gonothorax* (Giebel), Conn., Fla., La., Mass., Me., S. C.

Laughing Gull, *Larus atricilla* L.
(L) *Degeeriella punctata* (Nitzsch), S. C.
(L) *Philopterus gonothorax* (Giebel), Fla., La., Mass., S. C.
(M) *Giebelella* sp., La.

Bonaparte's Gull, *Larus philadelphia* (Ord.)
(L) *Actornithophilus funebre* (Kell.), Ala.
(L) *Degeeriella atrimarginata* (Kell. & Chap.), Del.
(L) *Degeeriella punctata* (Nitzsch), Del.
(L) *Menopon* sp., Del.
(L) *Philopterus gonothorax* (Giebel), Ala., Del., N. H.

Forster's Tern, *Sterna forsteri* Nuttall.
(L) *Actornithophilus funebre* (Kell.), Fla.
(L) *Philopterus melanocephalus* (Nitzsch), Fla., S. C.

Common Tern, *Sterna hirundo hirundo* L.
(L) *Philopterus melanocephalus* (Nitzsch), S. C., Va.

Roseate Tern, *Sterna dougalli dougalli* Montagu.
(L) *Menopon* sp., Mass.
(L) *Philopterus melanocephalus* (Nitzsch), Mass., N. H.

Eastern Sooty Tern, *Sterna fuscata fuscata* L.
(L) *Degeeriella gloriosa* (Kell. & Kuwana), Fla.
(L) *Philopterus* sp., Fla.

Bridled Tern, *Sterna anæthetus melanoptera* Swainson.
(L) *Actornithophilus milleri* (Kell. & Kuwana), S. C.
(L) *Degeeriella gloriosa* (Kell. & Kuwana), S. C.
(L) *Philopterus melanocephalus* (Nitzsch), Ala., S. C.

Least Tern, *Sterna antillarum antillarum* (Lesson).
(L) *Degeeriella* sp., La., S. C.
(L) *Philopterus melanocephalus* (Nitzsch), Fla., La., S. C.

Royal Tern, *Thalasseus maximus maximus* (Boddaert).
(L) *Actornithophilus funebre* (Kell.), Fla.
(L) *Degeeriella sellata* (Burmeister), S. C.
(L) *Menopon* sp., Fla., S. C.
(L) *Philopterus melanocephalus* (Nitzsch), Ala., Fla., Ga., La., S. C.
(M) *Sommatericola* sp., S. C.

Caspian Tern, *Hydroprogne caspia imperator* (Coues).
(L) *Actornithophilus funebre* (Kell.), Ga., Mass.
(L) *Degeeriella præstans* (Kell.), D. C., La., Mass.
(L) *Menopon* sp., D. C., Ga., La.
(L) *Philopterus melanocephalus* (Nitzsch), D. C., La., Mass.

Black Tern, *Chlidonias nigra surinamensis* (Gmelin).
(L) *Degeeriella phæonota* (Nitzsch), S. C.
(L) *Philopterus* sp., S. C.

Noddy Tern, *Anous stolidus stolidus* (L.).
(L) *Degeeriella obtusa* (Kell. & Kuwana), Fla.

Black Skimmer, *Rynchops nigra nigra* L.
(L) *Actornithophilus latifasciatus* (Piaget), La., S. C.
(L) *Philopterus elongatus* (Piaget), La., S. C.

Dovekie, *Alle alle* (L.).
(L) *Degeeriella maritima* (Kell. & Chap.), Mass., N. H., Pa., S. C.
(L) *Holomenopon loomisii* (Kell.), Mass., Pa., S. C.
(L) *Philopterus montereyi* (Kell.), Mass., N. H., Pa., S. C.

Eastern Mourning Dove, *Zenaidura macroura carolinensis* (L.).
(L) *Columbicola columbæ* (L.), Ill., Ohio, S. C., Va.
(L) *Physconelloides zenaiduræ* (McGregor), Ohio, Va.
(M) *Falciger* sp., S. C.

Eastern Ground Dove, *Columbigallina passerina passerina* (L.).
(L) *Columbicola columbæ* (L.), Fla.
(L) *Physconelloides zenaiduræ* (McGregor), Fla.
Yellow-billed Cuckoo, *Coccyzus americanus americanus* (L.).
(L) *Cuculiphilus fasciatus* (Scopoli), Va.
(L) *Culiculæcus coccygus* (Osborn), S. C., Va.
Barn Owl, *Tyto alba pratincola* (Bonaparte).
(L) *Kurodaia subpachygaster* (Piaget), Ohio.
Eastern Screech Owl, *Otus asio naevius* (Gmelin).
(L) *Kurodaia subpachygaster* (Piaget), D. C.
(L) *Philopterus cursor* (Nitzsch), S. C.
(F) *Lynchia americana* Leach, Pa., S. C.
(F) *Ornithoica confluenta* Say, S. C.
Great Horned Owl, *Bubo virginianus virginianus* (Gmelin).
(L) *Eustrigiphilus bubonis* (Osborn), Mass.
(L) *Kurodaia subpachygaster* (Piaget), Me., Mich., N. C., N. Y., S. C.
(L) *Philopterus cursor* (Nitzsch), S. C.
(F) *Lynchia americana* Leach, Ill., Mass., Md., N. H., N. Y., S. C.
Snowy Owl, *Nyctea nyctea* (L.).
(L) *Eustrigiphilus ceblebrachys* (Nitzsch), Me., N. H.
Florida Burrowing Owl, *Speotyto cunicularia floridana* Ridgway.
(L) *Kurodaia pectinatum* (Osborn), Fla.
(L) *Philopterus syrnii* (Packard), Fla.
Northern Barred Owl, *Strix varia varia* Barton.
(L) *Kurodaia subpachygaster* (Piaget), S. C.
(L) *Philopterus syrnii* (Packard), Pa., S. C.
(F) *Lynchia americana* Leach, Ohio.
Florida Barred Owl, *Strix varia alleni* Ridgway.
(L) *Kurodaia subpachygaster* (Piaget), Ala.
(F) *Lynchia* sp., Ala.
(M) *Liponyssus* sp., Fla.
Short-eared Owl, *Asio flammeus flammeus* (Pont.).
(L) *Philopterus syrnii* (Packard), Mich.
Saw-whet Owl, *Cryptoglaux acadica acadica* (Gmelin).
(L) *Philopterus cursor* (Nitzsch), Mass., Md.
Chuck-will's-widow, *Antrostomus carolinensis* (Gmelin).
(F) *Pseudolynchia brunnea* Latr., Ohio.
(M) *Trombicula irritans* (Riley), Fla.
Eastern Nighthawk, *Chordeiles minor minor* (Forster).
(L) *Esthiopterum macrocephalum* (Kell.), Me., N. H., S. C.
Chimney Swift, *Chætura pelagica* (L.).
(L) *Dennyus dubius* (Kell.), Mass., Md., N. Y., Ohio, Pa., S. C., Va.
(M) *Cyclacarus aberrans* Ewing, Pa.
(M) *Dermanyssus gallinæ* (Degeer), Va.
Eastern Belted Kingfisher, *Megaceryle alcyon alcyon* (L.).
(L) *Philopterus duplicatus* (Piaget), S. C., Va.
Northern Flicker, *Colaptes auratus luteus* Bangs.
(L) *Degeeriella marginatula* Harrison, Del.
(L) *Menacanthus præcursor* (Kell.), N. H., Va.
(L) *Philopterus jungens* (Kell.), Del., N. H., Va.
(M) *Atricholælaps glasgowi* (Ewing), Del.
(M) *Dermanyssus prognephilus* Ewing, Va.
(M) *Trombicula irritans* (Riley), Va.
Northern Pileated Woodpecker, *Ceophlæus pileatus abieticola* Bangs.
(L) *Menacanthus præcursor* (Kell.), N. H.
(T) *Ornithodoros* sp., S. C.
Red-bellied Woodpecker, *Centurus carolinus* (L.).
(L) *Menacanthus præcursor* (Kell.), Ohio.
(L) *Philopterus californiensis* (Kell.), S. C.

Red-headed Woodpecker, *Melanerpes erythrocephalus* (L.).
(L) *Degeeriella marginatula* Harrison, S. C.
Yellow-bellied Sapsucker, *Sphyrapicus varius varius* (L.).
(L) *Philopterus californiensis* (Kell.), Fla., Md., S. C., Vt.
Northern Hairy Woodpecker, *Dryobates villosus septentrionalis* (Nuttall).
(L) *Menacanthus præcursor* (Kell.), N. H.
(M) *Atricholæpas* sp., Md.
Northern Downy Woodpecker, *Dryobates pubescens medianus* (Swainson).
(L) *Philopterus californiensis* (Kell.), Ohio, Va.
(F) *Ornithoica confluenta* Say, N. H.
(F) *Ornithomyia anchineuria* Speiser, N. H.
(M) *Dermanyssus prognephilus* Ewing, Va.
Red-cockaded Woodpecker, *Dryobates borealis* (Vieillot).
(L) *Degeeriella* sp., N. C.
Eastern Kingbird, *Tyrannus tyrannus* (L.).
(L) *Degeeriella vulgata* (Kell.), N. Y., Va.
(L) *Ricinus angulatus* (Kell.), S. C.
(M) *Trouessartia* sp., S. C.
Arkansas Kingbird, *Tyrannus verticalis* Say.
(L) *Degeeriella fœda* (Kell.), Mass.
Northern Crested Flycatcher, *Myiarchus crinitus boreus* Bangs.
(L) *Philopterus subflavescens* (Geoffroy), Fla., Ga.
(M) *Liponyssus sylviarum* (C. & F.), Ala.
(M) *Trombicula irritans* (Riley), S. C.
Eastern Phœbe, *Sayornis phœbe* (Latham).
(L) *Ricinus* sp., N. H.
(M) *Liponyssus sylviarum* (C. & F.), N. H., Ohio, Pa.
(M) *Proctophyllodes* sp., N. Y.
Acadian Flycatcher, *Empidonax virescens* (Vieillot).
(L) *Philopterus subflavescens* (Geof.), N. H.
Least Flycatcher, *Empidonax minimus* (Baird & Baird).
(L) *Ricinus sucinaceus* (Kell.), Ohio.
Prairie Horned Lark, *Otocoris alpestris praticola* Henshaw.
(T) *Hæmaphysalis leporis-palustris* Packard, Mich.
Tree Swallow, *Iridoprocne bicolor* (Vieillot).
(L) *Degeeriella longa* (Kell.), Fla., Mich., S. C.
(L) *Myrsidea dissimilis* (Kell.), Fla., Mass., Mich., N. H., S. C.
(L) *Philopterus domesticus* (Kell.), Fla., Mich., N. H., S. C.
(M) *Trouessartia* sp., Fla.
Bank Swallow, *Riparia riparia riparia* (L.).
(L) *Myrsidea dissimilis* (Kell.), S. C.
(M) *Atricholæpas glasgowi* (Ewing), Pa.
(M) *Liponyssus sylviarum* (C. & F.), Pa.
Rough-winged Swallow, *Stelgidopteryx ruficollis serripennis* (Audubon).
(M) *Atricholæpas* sp., Va.
(M) *Liponyssus sylviarum* (C. & F.), Md.
Barn Swallow, *Hirundo erythrogaster* Boddaert.
(L) *Myrsidea dissimilis* (Kell.), Vt.
(L) *Philopterus domesticus* (Kell.), N. C., S. C.
(M) *Dermanyssus gallinæ* (Degeer), Mass., Mich.
(M) *Liponyssus sylviarum* (C. & F.), N. H., Ohio, Vt.
Northern Cliff Swallow, *Petrochelidon albifrons albifrons* (Rafinesque).
(L) *Myrsidea dissimilis* (Kell.), N. H.
Purple Martin, *Progne subis subis* (L.).
(L) *Myrsidea dissimilis* (Kell.), Mich., N. H.
(L) *Philopterus domesticus* (Kell.), Mich., N. H.
(M) *Dermanyssus prognephilus* Ewing, Ala.
Northern Blue Jay, *Cyanocitta cristata cristata* (L.).
(L) *Degeeriella eustigma* (Kell.), N. C., Va.
(L) *Menacanthus persignatus* (Kell. & Chap.), Ala.

(L) *Myrsidea funerea* (Kell. & Chap.), Ala., N. C.
(L) *Philopterus cristata* Malcomson, Ala., Ga., Md., N. H., S. C., Va.
(F) *Ornithoica confluenta* Say, Mass., Md.
(M) *Liponyssus sylviarum* (C. & F.), Va.
(T) *Hæmaphysalis leporis-palustris* Packard, Md., Va.

Eastern Crow, *Corvus brachyrhynchos brachyrhynchus* Brehm.
(L) *Degeeriella rotundata* (Osborn), Md., N. Y.
(L) *Myrsidea americana* (Kell.), D. C., Md., N. C., N. Y., S. C.
(L) *Philopterus corvi* (Osborn), Md., N. C., N. Y., S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, Md.

Southern Crow, *Corvus brachyrhynchos paulus* Howell.
(L) *Myrsidea americana* (Kell.), Fla., S. C.
(L) *Philopterus corvi* (Osborn), S. C.
(M) *Liponyssus sylviarum* (C. & F.), S. C.
(M) *Trouessartia corvina* (Koch), Fla.
(T) *Amblyomma americanum* (L.), S. C.

Fish Crow, *Corvus ossifragus* Wilson.
(L) *Myrsidea americana* (Kell.), Fla., S. C.
(L) *Philopterus corvi* (Osborn), Fla., S. C.

Black-capped Chickadee, *Penthestes atricapillus atricapillus* (L.).
(L) *Ricinus* sp., Ohio.
(F) *Ornithoica confluenta* Say, Mass.
(M) *Analgopsis passerinus* (L.), N. Y.

Carolina Chickadee, *Penthestes carolinensis carolinensis* (Audubon).
(L) *Degeeriella vulgata* (Kell.), Md.
(M) *Trombicula irritans* (Riley), S. C.

Tufted Titmouse, *Bæolophus bicolor* (L.).
(L) *Myrsidea incerta* (Kell.), S. C., Va.
(L) *Philopterus* sp., Ohio, S. C.
(M) *Trombicula irritans* (Riley), S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, S. C., Va.

White-breasted Nuthatch, *Sitta carolinensis carolinensis* Latham.
(F) *Ornithoica confluenta* Say, N. H.
(F) *Ornithomyia anchineuria* Speiser, N. H.

Eastern House Wren, *Troglodytes aëdon* Vieillot.
(L) *Menopon* sp., N. Y.
(L) *Philopterus subflavescens* (Geof.), N. Y.
(M) *Dermanyssus gallinæ* (Deeger), Mass.
(M) *Liponyssus sylviarum* (C. & F.), D. C., N. Y., Ohio.
(M) *Trombicula whartoni* Ewing, S. C.

Carolina Wren, *Thryothorus ludovicianus ludovicianus* (Latham).
(L) *Degeeriella* sp., S. C.
(M) *Analgopsis* sp., N. C.
(M) *Trombicula whartoni* Ewing, N. C.
(T) *Amblyomma maculatum* Koch, S. C.
(T) *Dermacentor variabilis* (Say), S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, N. C., S. C., Va.
(T) *Ixodes brunneus* Koch, S. C.

Florida Wren, *Thryothorus ludovicianus miamensis* Ridgway.
(L) *Philopterus mirus* (Kell. & Chap.), Fla.

Eastern Mockingbird, *Mimus polyglottos polyglottos* (L.).
(L) *Degeeriella eustigma* (Kell.), Ala., N. C., S. C.
(L) *Myrsidea incerta* (Kell.), Ala., Fla., S. C.
(L) *Philopterus subflavescens* (Geof.), Fla., S. C.
(M) *Trombicula whartoni* Ewing, S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, S. C.

Catbird, *Dumetella carolinensis* (L.).
(L) *Myrsidea incerta* (Kell.), Fla., Md., N. Y., Ohio, S. C., Vt.
(F) *Ornithomyia anchineuria* Speiser, Conn., Mass., N. H., N. Y., Vt.

(M) *Liponyssus occidentalis* Ewing, Pa.
(M) *Liponyssus sylviarum* (C. & F.), Pa.
(T) *Hæmaphysalis leporis-palustris* Packard, Mass., N. H.
(T) *Ixodes brunneus* Koch, Conn., S. C.

Brown Thrasher, *Toxostoma rufum* (L.).
(L) *Degeeriella vulgata* (Kell.), S. C.
(L) *Myrsidea incerta* (Kell.), Ala., Fla., Ill., N. Y., S. C.
(L) *Philopterus subflavescens* (Geof.), Mich., N. Y., S. C., Va.
(F) *Ornithomyia anchineuria* Speiser, N. Y.
(M) *Liponyssus sylviarum* (C. & F.), Ala.
(M) *Neoschöngastia americana* (Hirst), N. C.
(M) *Pterodectes* sp. S. C.
(M) *Trombicula irritans* (Riley), N. C.
(M) *Trombicula whartoni* Ewing, S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, Md., N. C., S. C., Va.
(T) *Ixodes brunneus* Koch, S. C.

Eastern Robin, *Turdus migratorius migratorius* L.
(L) *Degeeriella vulgata* (Kell.), N. C.
(L) *Menacanthus chrysophæum* (Kell.), N. C., N. Y.
(L) *Myrsidea incerta* (Kell.), Md., Va.
(L) *Philopterus migratorii* Peters, Del., Fla., Mass., N. C., Ohio, Va.
(L) *Philopterus subflavescens* (Geof.), Fla., Ind., N. C.
(L) *Ricinus* sp., Del., Va.
(F) *Ornithoica confluenta* Say, N. Y.
(F) *Ornithomyia anchineuria* Speiser, Mass., N. H., N. Y., Ohio.
(M) *Analgopsis* sp., Del.
(M) *Cheyletiella* sp., Del.
(M) *Liponyssus sylviarum* (C. & F.), D. C., Mass., N. H., N. Y., Ohio.
(M) *Neoschöngastia americana* (Hirst), Va.
(M) *Trombicula whartoni* Ewing, N. C.
(T) *Hæmaphysalis leporis-palustris* Packard, Del., Md., Ohio.
(T) *Ixodes brunneus* Koch, S. C.

Southern Robin, *Turdus migratorius achrusteus* (Batchelder).
(L) *Degeeriella vulgata* (Kell.), Fla.
(L) *Philopterus subflavescens* (Geof.), Fla.

Wood Thrush, *Hylocichla mustelina* (Gmelin).
(L) *Myrsidea incerta* (Kell.), N. Y.
(T) *Hæmaphysalis leporis-palustris* Packard, N. C.

Eastern Hermit Thrush, *Hylocichla guttata faxoni* Bangs & Penard.
(L) *Degeeriella eustigma* (Kell.), N. Y.
(L) *Myrsidea incerta* (Kell.), Ala., N. C., N. Y.
(L) *Philopterus subflavescens* (Geof.), Ala., Va.
(F) *Ornithoica confluenta* Say, N. H.
(F) *Ornithomyia anchineuria* Speiser, N. Y., Wis.
(M) *Trombicula whartoni* Ewing, S. C.
(T) *Amblyomma tuberculatum* Marx, Fla.
(T) *Hæmaphysalis leporis-palustris* Packard, Ala., Mass., Md., N. C., S. C., Va.
(T) *Ixodes brunneus* Koch, S. C.

Olive-backed Thrush, *Hylocichla ustulata swainsoni* (Tschudi).
(L) *Myrsidea incerta* (Kell.), Md., N. Y., S. C.
(L) *Philopterus subflavescens* (Geof.), N. H., S. C.
(F) *Ornithomyia anchineuria* Speiser, N. Y.
(T) *Hæmaphysalis leporis-palustris* Packard, Mass., S. C., Va.

Gray-cheeked Thrush, *Hylocichla minima aliciæ* (Baird).
(L) *Myrsidea incerta* (Kell.), N. Y.

Veery, *Hylocichla fuscescens fuscescens* (Stephens).
(L) *Degeeriella* sp., N. H.
(F) *Ornithomyia anchineuria* Speiser, Conn., N. H., N. Y.

Eastern Bluebird, *Sialia sialis sialis* (L.).
(L) *Philopterus sialii* (Osborn), Fla., N. C., N. H., N. Y., Ohio, S. C., Va.
(L) *Ricinus* sp., Fla.
(F) *Ornithomyia anchineuria* Speiser, N. H.
(M) *Analgopsis* sp., N. C.
(M) *Dermanyssus prognephilus* (Ewing), S. C.

Eastern Golden-crowned Kinglet, *Regulus satrapa satrapa* Lichtenstein.
(L) *Philopterus incisus* (Kell.), Va.
(F) *Ornithoica confluenta* Say, Md., N. Y.

Eastern Ruby-crowned Kinglet, *Corthylio calendula calendula* (L.).
(F) *Ornithomyia confluenta* Say, N. Y., S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, S. C.

Northern Shrike, *Lanius borealis borealis* Vieillot.
(L) *Philopterus subflavescens* (Geof.), N. H.

Loggerhead Shrike, *Lanius ludovicianus ludovicianus* L.
(L) *Menacanthus chrysophæum* (Kell.), Fla.
(L) *Philopterus subflavescens* (Geof.), Fla., S. C.
(T) *Ixodes* sp., S. C.

Migrant Shrike, *Lanius ludovicianus migrans* Palmer.
(L) *Philopterus subflavescens* (Geof.), Mich., Ohio, Va.

Starling, *Sturnus vulgaris vulgaris* L.
(L) *Degeeriella illustris* (Kell.), Md.
(L) *Degeeriella nebulosa* (Burmeister), Del., Md., Mich., Ohio, S. C., Va.
(L) *Menacanthus spinosum* (Piaget), Md., Mich., N. Y., Ohio, S. C., Va.
(M) *Liponyssus sylviarum* (C. & F.), N. H.
(T) *Hæmaphysalis leporis-palustris* Packard, Del., Ohio, Va.

White-eyed Vireo, *Vireo griseus griseus* (Boddaert).
(L) *Philopterus subflavescens* (Geof.), S. C.
(L) *Ricinus* sp., S. C.

Yellow-throated Vireo, *Vireo flavifrons* Vieillot.
(T) *Amblyomma* sp., Ga.

Blue-headed Vireo, *Vireo solitarius solitarius* (Wilson).
(T) *Hæmaphysalis leporis-palustris* Packard, Ala.

Red-eyed Vireo, *Vireo olivaceus* (L.).
(L) *Philopterus subflavescens* (Geof.), Ala., Md., N. Y., S. C.
(L) *Ricinus angulatus* (Kell.), Ala.
(M) *Analgopsis* sp., S. C.
(M) *Liponyssus sylviarum* (C. & F.), N. H.
(M) *Trombicula irritans* (Riley), S. C.

Black and White Warbler, *Mniotilta varia* (L.).
(L) *Myrsidea incerta* (Kell.), N. Y.
(F) *Ornithoica confluenta* Say, Mass.

Northern Parula Warbler, *Compsothlypis americana pusilla* (Wilson).
(L) *Myrsidea incerta* (Kell.), Ga.
(L) *Ricinus* sp., S. C.

Eastern Yellow Warbler, *Dendroica æstiva æstiva* (Gmelin).
(L) *Philopterus subflavescens* (Geof.), N. H.

Magnolia Warbler, *Dendroica magnolia* (Wilson).
(L) *Degeeriella eustigma* (Kell.), N. Y.
(L) *Myrsidea incerta* (Kell.), Mass., N. Y.

Cape May Warbler, *Dendroica tigrina* (Gmelin).
(L) *Myrsidea incerta* (Kell.), N. Y.

Myrtle Warbler, *Dendroica coronata* (L.).
(L) *Degeeriella vulgata* (Kell.), N. Y.
(L) *Ricinus* sp., N. C.
(F) *Ornithoica confluenta* Say, N. H.
(F) *Ornithomyia anchineuria* Speiser, N. Y.
(M) *Analgopsis* sp., N. C., Va.
(M) *Proctophyllodes* sp., N. C.

Blackburnian Warbler, *Dendroica fusca* (Müller).
(L) *Menacanthus chrysophæum* (Kell.), Md.
(L) *Ricinus pallens* (Kell.), Md.
(M) *Proctophyllodes* sp., Md.
Yellow-throated Warbler, *Dendroica dominica dominica* (L.).
(L) *Myrsidea incerta* (Kell.), S. C.
(M) *Megninia tyrrelli* (Haller), S. C.
Chestnut-sided Warbler, *Dendroica pensylvanica* (L.).
(L) *Myrsidea incerta* (Kell.), Mass., N. Y.
(M) *Trouessartia* sp., Md.
Bay-breasted Warbler, *Dendroica castanea* (Wilson).
(L) *Philopterus subflavescens* (Geof.), Md.
Black-poll Warbler, *Dendroica striata* (Forster).
(L) *Myrsidea incerta* (Kell.), Mass., Md., N. Y.
Northern Pine Warbler, *Dendroica pinus pinus* (Wilson).
(T) *Hæmaphysalis leporis-palustris* Packard, S. C.
Northern Prairie Warbler, *Dendroica discolor discolor* (Vieillot).
(L) *Ricinus pallens* (Kell.), Md.
(T) *Hæmaphysalis leporis-palustris* Packard, Mich.
Yellow Palm Warbler, *Dendroica palmarum hypochrysea* Ridgway.
(T) *Dermacentor variabilis* (Say), S. C.
(M) *Analgopsis passerinus* (L.), N. C.
Oven-bird, *Seiurus aurocapillus* (L.).
(L) *Menacanthus chrysophæum* (Kell.), N. Y.
(L) *Myrsidea incerta* (Kell.), Md., N. Y.
(M) *Liponyssus sylviarum* (C. & F.), N. H.
(T) *Hæmaphysalis leporis-palustris* Packard, Mass., S. C.
(T) *Ixodes brunneus* Koch, S. C.
Northern Water-Thrush, *Seiurus noveboracensis noveboracensis* (Gmelin).
(L) *Menacanthus* sp., N. Y.
(F) *Ornithoica confluenta* Say, N. H.
(F) *Ornithomyia anchineuria* Speiser, N. H.
Louisiana Water-Thrush, *Seiurus motacilla* (Vieillot).
(T) *Hæmaphsalis leporis-palustris* Packard, S. C.
Kentucky Warbler, *Oporornis formosus* (Wilson).
(T) *Hæmaphysalis leporis-palustris* Packard, Md.
Northern Yellow-throat, *Geothlypis trichas brachidactyla* (Swainson).
(L) *Ricinus pallens* (Kell.), Mass., N. Y.
(F) *Ornithoica confluenta* Say, N. H.
(F) *Ornithomyia anchineuria* Speiser, N. H.
Florida Yellow-throat, *Geothlypis trichas ignota* Chapman.
(T) *Hæmaphysalis leporis-palustris* Packard, Fla., Ga., S. C.
Yellow-breasted Chat, *Icteria virens virens* (L.).
(L) *Menacanthus chrysophæum* (Kell.), Md., Ohio.
(M) *Trombicula irritans* (Riley), Va.
Hooded Warbler, *Wilsonia citrina* (Boddaert).
(L) *Ricinus pallens* (Kell.), Md.
(F) *Ornithoica confluenta* Say, Md.
(F) *Ornithomyia anchineuria* Speiser, Md.
(T) *Hæmaphysalis leporis-palustris* Packard, Md.
Canada Warbler, *Wilsonia canadensis* (L.).
(L) *Ricinus pallens* (Kell.), N. Y.
American Redstart, *Setophaga ruticilla* (L.).
(L) *Menacanthus* sp., N. Y.
(L) *Myrsidea incerta* (Kell.), N. Y.
(L) *Philopterus subflavescens* (Geof.), Md.
(T) *Hæmaphysalis leporis-palustris* Packard, S. C.
English Sparrow, *Passer domesticus domesticus* (L)..
(L) *Degeeriella vulgata* (Kell.), Ohio, Wis.
(T) *Hæmaphysalis leporis-palustris* Packard, Va.

Eastern Meadowlark, *Sturnella magna magna* (L.).
(L) *Degeeriella picturata* (Osborn), Md., S. C.
(L) *Menacanthus chrysophæum* (Kell.), Md., S. C.
(L) *Philopterus subflavescens* (Geof.), S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, S. C., Va.
(T) *Ixodes* sp. S. C.
Southern Meadowlark, *Sturnella magna argutula* Bangs.
(L) *Philopterus subflavescens* (Geof.), Fla.
(M) *Trombicula hominis* Ewing, Fla.
(T) *Amblyomma tuberculatum* Marx, Fla.
Eastern Red-wing, *Agelaius phœniceus phœniceus* (L.).
(L) *Degeeriella illustris* (Kell.), Fla.
(L) *Myrsidea americana* (Kell.), Fla., S. C.
(L) *Philopterus subflavescens* (Geof.), Fla., Mass., S. C.
(F) *Ornithomyia anchineuria* Speiser, Conn.
(M) *Harpyrhynchus brevis* Ewing, Md.
(M) *Liponyssus bursa* (Berlese), Fla., S. C.
(M) *Liponyssus sylviarum* (C. & F.), N. H.
(T) *Dermacentor variabilis* (Say), S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, Del., S. C.
Orchard Oriole, *Icterus spurius* (L.).
(L) *Myrsidea incerta* (Kell.), S. C.
Baltimore Oriole, *Icterus galbula* (L.).
(L) *Ricinus* sp., Mich.
(F) *Ornithomyia anchineuria* Speiser, Conn.
(M) *Analgopsis* sp., N. H.
Rusty Blackbird, *Euphagus carolinus* (Muller).
(L) *Myrsidea americana* (Kell.), Ohio.
Boat-tailed Grackle, *Cassidix mexicanus major* (Vieillot).
(L) *Menacanthus chrysophæum* (Kell.), Fla., Ga.
(L) *Myrsidea americana* (Kell.), Fla., Ga., La.
(L) *Philopterus subflavescens* (Geof.), La.
Purple Grackle, *Quiscalus quiscula quiscula* (L.).
(L) *Menacanthus chrysophæum* (Kell.), Md.
(L) *Philopterus quiscali* (Osborn), Mass.
(F) *Ornithoica confluenta* Say, Mass.
(F) *Ornithomyia anchineuria* Speiser, Mass.
(T) *Hæmaphysalis leporis-palustris* Packard, Md., Va.
Florida Grackle, *Quiscalus quiscula aglæus* Baird.
(L) *Myrsidea americana* (Kell.), Fla., La., S. C.
(L) *Philopterus quiscali* (Osborn), Fla., La., S. C.
(M) *Liponyssus sylviarum* (C. & F.), Ala.
Bronzed Grackle, *Quiscalus quiscula æneus* Ridgway.
(L) *Degeeriella illustris* (Kell.), Del.
(L) *Menacanthus chrysophæum* (Kell.), Ill., Ohio.
(F) *Ornithoica confluenta* Say, Mass.
(T) *Hæmaphysalis leporis-palustris* Packard, Del.
Eastern Cowbird, *Molothrus ater ater* (Boddaert).
(L) *Degeeriella illustris* (Kell.), Va.
(F) *Ornithoica confluenta* Say, Mass., N. H.
(F) *Ornithomyia anchineuria* Speiser, Mass., Mich., N. H., Ohio.
(M) *Dermanyssus prognephilus* Ewing, Mich.
(M) *Liponyssus sylviarum* (C. & F.), Mass.
(T) *Hæmaphysalis leporis-palustris* Packard, Mich., N. Y.
Scarlet Tanager, *Piranga erythromelas* Vieillot.
(L) *Philopterus subflavescens* (Geof.), Md.
(F) *Ornithomyia anchineuria* Speiser, N. Y.
Summer Tanager, *Piranga rubra rubra* (L.).
(L) *Philopterus subflavescens* (Geof.), S. C.
(M) *Trombicula irritans* (Riley), S. C.

Eastern Cardinal, *Richmondena cardinalis cardinalis* (L.).
(L) *Myrsidea incerta* (Kell.), Ala., Ga., Md., S. C.
(L) *Philopterus subflavescens* (Geof.), Fla,. Ga., S. C., Va.
(F) *Ornithomyia anchineuria* Speiser, Ohio.
(M) *Analgopsis* sp., Fla., S. C.
(T) *Amblyomma americanum* (L.), S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, Ga., S. C.
(T) *Ixodes* sp., S. C.

Rose-breasted Grosbeak, *Hedymeles ludovicianus* (L.).
(F) *Ornithoctona strigilecula* Ferris, Md.
(F) *Ornithomyia anchineuria* Speiser, Mass.

Painted Bunting, *Passerina ciris* (L.).
(T) *Hæmaphysalis leporis-palustris* Packard, S. C.

Eastern Purple Finch, *Carpodacus purpureus purpureus* (Gmelin).
(L) *Degeeriella vulgata* (Kell.), Vt.
(L) *Philopterus subflavescens* (Geof.), Me., N. H.
(F) *Ornithomyia anchineuria* Speiser, Mass., N. H.
(M) *Analgopsis* sp., Ohio.

Eastern Goldfinch, *Spinus tristis tristis* (L.).
(M) *Analgopsis* sp., Md.
(M) *Proctophylloides* sp., Mass.
(T) *Hæmaphysalis leporis-palustris* Packard, Md., S. C.

Red-eyed Towhee, *Pipilo erythrophthalmus erythrophthalmus* (L.).
(L) *Machærilæmus mæstum* (Kell. & Chap.), N. H., N. Y., S. C.
(L) *Myrsidea melanorum* (Kell.), Ala., Fla., N. Y., S. C., Va.
(L) *Philopterus subflavescens* (Geof.), Md.
(F) *Ornithoica confluenta* Say, Mass.
(F) *Ornithomyia anchineuria* Speiser, N. Y.
(M) *Analgopsis* sp., Md., S. C.
(M) *Liponyssus sylviarum* (C. & F.), S. C.
(M) *Proctophyllodes* sp., S. C.
(M) *Trombicula whartoni* Ewing, S. C.
(M) *Trouessartia* sp., S. C.
(T) *Amblyomma maculatum* Koch, S. C.
(T) *Dermacentor variabilis* (Say), S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, Md., S. C., Va.
(T) *Ixodes brunneus* Koch, S. C.

White-eyed Towhee, *Pipilo erythrophthalmus canaster* Howell.
(L) *Philopterus subflavescens* (Geof.), Ga.
(F) *Ornithoica confluenta* Say, S. C.

Eastern Savannah Sparrow, *Passerculus sandwichensis savanna* (Wilson).
(L) *Philopterus subflavescens* (Geof.), Mich., S. C.
(L) *Ricinus diffusus* (Kell.), Mass., S. C.
(F) *Ornithoica confluenta* Say, Ohio, Vt.
(F) *Ornithomyia anchineuria* Speiser, Conn., Mass., Mich., Vt.
(M) *Analgopsis* sp., N. C., S. C., Va.
(M) *Liponyssus sylviarum* (C. & F.), S. C.
(T) *Hæmaphysalis chordeilis* Packard, S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, Ga., Mass., N. C., S. C., Va.
(T) *Ixodes* sp., S. C.

Sharp-tailed Sparrow, *Ammospiza caudacuta caudacuta* (Gmelin).
(L) *Philopterus subflavescens* (Geof.), Fla., Ga.

Northern Seaside Sparrow, *Ammospiza maritima maritima* (Wilson).
(L) *Philopterus subflavescens* (Geof.), Conn.

Wakulla Seaside Sparrow, *Ammospiza maritima juncicola* (Griscom & Nichols).
(L) *Philopterus subflavescens* (Geof.), Fla.
(T) *Hæmaphysalis chordeilis* Packard, Fla.

Wayne's Seaside Sparrow, *Ammospiza maritima waynei* Oberholser.
(L) *Philopterus subflavescens* (Geof.), Ga.

Eastern Vesper Sparrow, *Poœcetes gramineus gramineus* (Gmelin).
(L) *Machærilæmus mæstum* (Kell. & Chap.), Mich.
(F) *Ornithomyia anchineuria* Speiser, Mich.
Bachman's Sparrow, *Aimophila æstivalis bachmani* (Audubon).
(M) *Analgopsis* sp., Ohio.
(T) *Hæmaphysalis leporis-palustris* Packard, Ga.
Pine-woods Sparrow, *Aimophila æstivalis æstivalis* (Lichtenstein).
(L) *Ricinus* sp. Fla.
Slate-colored Junco, *Junco hyemalis hyemalis* (L.).
(L) *Degeeriella vulgata* (Kell.), Md., N. H., N. Y., Ohio.
(L) *Machærilæmus mæstum* (Kell. & Chap.), N. H.
(L) *Menacanthus chrysophæum* (Kell), N. H.
(L) *Philopterus subflavescens* (Geof.), Mass., Md., N. H., Ohio.
(L) *Ricinus pallidus* (Kell.), Md.
(F) *Ornithoica confluenta* Say, Md., N. H., N. Y.
(F) *Ornithomyia anchineuria* Speiser, Me., N. H., N. Y., Ohio.
(M) *Analgopsis* sp., N. C., N. H., Va.
(T) *Hæmaphysalis leporis-palustris* Packard, Md., Mich., Ohio, S. C., Va.
Eastern Tree Sparrow, *Spizella arborea arborea* (Wilson).
(L) *Degeeriella vulgata* (Kell.), Ohio.
(L) *Ricinus* sp., N. Y.
(M) *Analgopsis* sp., Ohio.
Eastern Chipping Sparrow, *Spizella passerina passerina* (Bechstein).
(L) *Philopterus subflavescens* (Geof.), Ohio.
(L) *Ricinus* sp., Ohio.
(F) *Ornithoica confluenta* Say, Mass., N. H., N. Y.
(F) *Ornithomyia anchineuria* Speiser, Mass., Mich., N. H.
(M) *Analgopsis* sp., N. C., Ohio, Va.
(M) *Liponyssus sylviarum* (C. & F.), N. H.
(T) *Hæmaphysalis leporis-palustris* Packard, N. C., Ohio, Va.
(T) *Ixodes brunneus* Koch, S. C.
Eastern Field Sparrow, *Spizella pusilla pusilla* (Wilson).
(L) *Degeeriella vulgata* (Kell.), N. J.
(L) *Menacanthus chrysophæum* (Kell.), N. Y.
(L) *Myrsidea incerta* (Kell.), N. Y.
(L) *Philopterus subflavescens* (Geof.), Ohio, Va.
(F) *Ornithoica confluenta* Say, Ohio.
(F) *Ornithomyia anchineuria* Speiser, Ohio.
(M) *Analgopsis* sp., N. C., Va.
(M) *Liponyssus bursa* (Berlese), Va.
(M) *Proctophyllodes* sp., N. C.
(M) *Trombicula whartoni* Ewing, Md.
(T) *Hæmaphysalis leporis-palustris* Packard, Md., N. J., S. C.
(T) *Ixodes brunneus* Koch, S. C.
(T) *Ixodes* sp., N. J.
White-crowned Sparrow, *Zonotrichia leucophrys leucophrys* (Forster).
(L) *Degeeriella vulgata* (Kell.), N. H.
(L) *Myrsidea incerta* (Kell.), Vt.
(L) *Philopterus subflavescens* (Geof.), Md., Mich., N. H.
(L) *Ricinus* sp., N. H., Ohio.
(T) *Hæmaphysalis leporis-palustris* Packard, Mass., Md.
(T) *Ixodes* sp., Ohio.
White-throated Sparrow, *Zonotrichia albicollis* (Gmelin).
(L) *Degeeriella vulgata* (Kell.), D. C., N. Y., S. C.
(L) *Machærilæmus mæstum* (Kell. & Chap.), S. C.
(L) *Myrsidea incerta* (Kell.), S. C.
(L) *Philopterus subflavescens* (Geof.), Me.
(L) *Ricinus* sp., Ohio.
(F) *Ornithoica confluenta* Say, N. Y.

(F) *Ornithomyia anchineuria* Speiser, Mass., Md., N. H., N. Y., Vt.
(M) *Analgopsis* sp., Va.
(M) *Liponyssus sylviarum* (C. & F.), Mass., Md.
(T) *Hæmaphysalis leporis-palustris* Packard, Mass., Md., Ohio, S. C., Va.
(T) *Ixodes brunneus* Koch, S. C.
(T) *Ixodes* sp., Ala., S. C.

Eastern Fox Sparrow, *Passerella iliaca iliaca* (Merrem).
(L) *Degeeriella vulgata* (Kell.), N. Y., S. C.
(L) *Menacanthus chrysophæum* (Kell.), N. Y., Vt.
(L) *Myrsidea incerta* (Kell.), N. Y.
(L) *Philopterus subflavescens* (Geof.), Mass., Md., Vt.
(M) *Liponyssus sylviarum* (C. & F.), N. Y.
(M) *Proctophyllodes* sp., S. C.
(T) *Hæmaphysalis leporis-palustris* Packard, Mass.
(T) *Ixodes* sp., N. C.

Lincoln's Sparrow, *Melospiza lincolni lincolni* (Audubon).
(F) *Ornithoica confluenta* Say, N. H., N. Y.
(F) *Ornithomyia anchineuria* Speiser, N. H.
(T) *Hæmaphysalis leporis-palustris* Packard, Mass.

Swamp Sparrow, *Melospiza georgiana* (Latham).
(L) *Degeeriella vulgata* (Kell.), S. C.
(L) *Menacanthus chrysophæum* (Kell.), N. H.
(L) *Philopterus subflavescens* (Geof.), S. C.
(L) *Ricinus* sp., Mich., S. C.
(F) *Ornithoica confluenta* Say, N. H.
(F) *Ornithomyia anchineuria* Speiser, N. H.
(T) *Hæmaphysalis leporis-palustris* Packard, Ga., S. C.

Eastern Song Sparrow, *Melospiza melodia melodia* (Wilson).
(L) *Degeeriella vulgata* (Kell.), Ohio, Va.
(L) *Machærilæmus mæstum* (Kell. & Chap.), N. H.
(L) *Menacanthus chrysophæum* (Kell.), Conn., Del., D. C., Mass., N. H., N. Y., Ohio, S. C., Va.
(L) *Myrsidea incerta* (Kell.), Del., N. H.
(L) *Philopterus subflavescens* (Geof.), S. C.
(L) *Ricinus melospizæ* (McGregor), Del., Mich., N. H., Ohio, Pa.
(F) *Ornithoica confluenta* Say, Conn., Mass., N. H., Ohio, Vt.
(F) *Ornithomyia anchineuria* Speiser, Conn., Mass., N. H., N. Y., Ohio, Wis.
(M) *Analgopsis* sp., Del., Ohio, S. C., Va.
(M) *Liponyssus sylviarum* (C. & F.), Mass.
(M) *Trombicula bisignata* Ewing, Mass.
(M) *Trombicula cavicola* Ewing, Del.
(T) *Hæmaphysalis leporis-palustris* Packard, Conn., Del., Mass., Md., N. H., N. Y., Ohio, S. C., Va.
(T) *Ixodes brunneus* Koch, Mass.
(T) *Ixodes* sp., Mass., Md.

Eastern Snow Bunting, *Plectrophenax nivalis nivalis* (L.).
(L) *Menacanthus chrysophæum* (Kell.), Mich., Ohio.
(L) *Philopterus subflavescens* (Geof.), Mich., Ohio.
(L) *Ricinus angulatus* (Kell.), Mich.

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AN ANALYSIS OF SOME BANDING RECORDS OF THE EASTERN RED-WING

BY FRED MALLERY PACKARD

DURING the four years between July, 1930 and August, 1934, 1,498 Eastern Red-wings (*Agelaius p. phœniceus*) were banded on Cape Cod by workers at the Austin Ornithological Research Station.[1] A total of 169 returns were recorded, comprising 121 individuals, and 368 birds repeated a total of 1083 times during the period. Seventeen birds were recovered from localities away from Cape Cod. Over two hundred Red-wings were banded by the staff at substations and breeding colonies on other parts of the Cape, and the records of these birds are kept at the headquarters station at North Eastham, with the records of the local colony.

The writer is grateful to Dr. G. M. Allen of Harvard University for valuable suggestions which helped him utilize the material more efficiently. Pertinent information was generously supplied by the Department of Conservation of New Jersey and by the Chamber of Commerce, Salem, New Jersey.

THE MORTALITY RATE OF THE YOUNG

Table I shows that of 28 birds banded in the nest in June, 1933, ten repeated in July or August and three returned in 1934, involving twelve individuals. Thus further reports were received on 43 per cent, indicating a possible 57 per cent mortality during the first year. Allowing a certain percentage for individuals which did not visit the traps, or which may have slipped their bands in the nest, the mortality of the young may have been between 40 and 50 per cent before they were three months old.

TABLE I

NESTLINGS BANDED AT NORTH EASTHAM IN 1933

Nest	*Date Banded*	*Band Numbers*	*Number of Birds*	*Number of Birds Repeating in July or August, 1933*	*Number of Birds Returning, 1934*
1	June 3, 1933	B234324–26	3	1	..
2	June 6, 1933	B234327	1	1	..
3	June 6, 1933	B234328–30	3	..	1
4	June 9, 1933	B234331–33	3	2	..
5	June 13, 1933	B234335–37	3	..	..
6	June 17, 1933	B234413–14	2	..	1
7	June 21, 1933	B234449–52	4	2	1
8	June 21, 1933	B234453–55	3	1	..
9	June 21, 1933	B234456–58	3	1	..
10	June 25, 1933	B234460–62	3	2	..
			28	10	3

[1] Contribution No. 21 of the Austin Ornithological Research Station. For a description of the station see Austin, O. L., "The Austin Ornithological Research Station," *Bird-Banding*, Vol. 3, No. 2, 1932, pp. 51–63.

THE ORGANIZATION OF THE MIDSUMMER FLOCKS

It has been suggested that in the premigratory movements of July and August the young leave the swamps in family groups accompanied by some of the females which raised them. Table II below shows the relationships of the nestlings banded in June, 1933, to one another after they began moving to the uplands the following month.

TABLE II

THE RECAPTURES OF THE NESTLINGS OF TABLE I DURING JULY, 1933

A=a.m.
P=p.m.

Numbers following time indicate trap:
Trap 1—House trap on drive near field.
Trap 2—House trap in field.
Trap 3—Duck trap in marsh.

	Nest No.	*July 22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*
B234326	1	.....	.....	.....	8A; 2	11A; 1	11A; 2 6P; 2	.....	.....
B234327	2	.....	.....	.....	.....	.....	.....	.....	8A; 3
B234331	4	8A; 1	.....	.....	.....	.....	.....	.....	.....
B234333	4	.....	8A; 2	.....	8A; 1	.....	8P; 2	.....	.....
B234449	7	.....	8A; 2	8P; 2	.....	.....	.....	.....	.....
B234452	7	.....	11A; 2	.....	8A; 2	8A; 1	6P; 2	8A; 2	.....
B234454	8	.....	8A; 1	.....	.....	8A; 2	.....	.....	.....
B234456	9	.....	.....	.....	.....	.....	8A; 2	.....	.....
B234460	10	.....	.....	.....	.....	2P; 1	.....	.....	.....
B234461	10	.....	.....	.....	.....	8A; 2	.....	.....	.....

Traps 1 and 2 are near together in a large field a few hundred feet from the marsh where the birds were born. At no time were two birds from the same nest caught together in a trap. In a single instance one bird (B234452) was taken from a trap three hours after its sibling (B234449). Again, birds from nest 10 were released from associated traps within six hours of each other. Apart from such distant relationships there seems to have been little tendency to move in family groups.

Among the midsummer flocks of 1933 were six birds identified as adult females. Three of these were unbanded birds, and the rest had been banded early the preceding spring. As they had not been caught during the nesting season, it is unlikely that they were local residents, or the parents of any of the local young with which they were trapped. None of them repeated more than twice in July nor showed any tendency to associate with any particular juveniles. The adult males do not associate with the young in this midsummer movement between the swamp and the uplands, being trapped with them but rarely, and, when seen, the males are always flying alone.

THE INSTABILITY OF THE FLOCKS

The make-up of the flock appears to change continually, different birds flocking together at different times of the day. It was possible to reconstruct with some degree of accuracy the membership of each flock as it visited the traps, and it was clearly evident that indi-

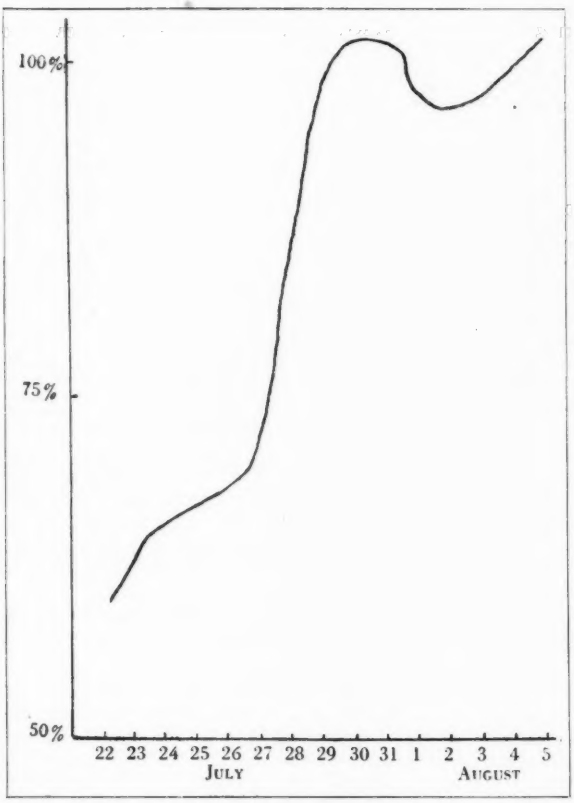
viduals frequently shift from one flock to another. For example, B234454 was captured at 8 A.M. in an upland trap with seven other young; at 11 A.M. it was retaken there with another group of seven, none of which had been in the first flock. At 8 P.M. it reappeared with six companions, of which two had been caught separately during the day: one had been with B234454 at 8 A.M., and the other at 11 A.M. This is as close an association of individuals as is shown by any of the records, and most of the relationships appear to be quite haphazard. A further indication of the instability of the flock is the fact that one often sees birds from one flock break away from it and join another group as it passes over the place where the first group may be feeding.

Each day more young appear at the upland traps and merge their ranks with the early venturers. Almost every round of the traps discovers many unbanded juveniles. Most of the young known to have been raised on the property (Table I) visited the traps more or less continuously over a period of several days before disappearing for the season. These have been omitted from the accompanying graph, which shows the general percentages of the young banded during the period which did not reappear after the banding date that summer. The curve shows that from July 23d to 27th about sixty per cent of the new young each day were not recaptured during the summer; after the 28th a much higher percentage of the young banded appeared but this once. Such extremely high numbers of disappearing birds indicate that many of these birds do not stay on the property, but are already on their way to other localities by late July. These figures are based upon captures of 185 young birds, many of which were probably not local residents, but had come from other parts of Cape Cod, or even from the mainland.

To summarize, it has been shown that there is no reason to believe that the conspicuous premigratory flocking of the juvenile Red-wings is organized on the basis of family groups, but rather that the organization of the flocks is quite haphazard and variable. The few adults (mostly females) trapped with the young at this time give no evidence of being more than casually associated with them. The juveniles themselves are at this time already moving slowly through the area to other regions.

THE MIDSUMMER MOLT AND THE FALL MIGRATION

By the time the flocks of young are visiting the upland traps from July 21st until August 6th, the adults have almost entirely disappeared from the fields. Dr. A. A. Allen (1914, p. 102 *et seq.*) summarizes the literature upon this point stating that such a disappearance takes place each season all over their nesting area during the first part of August. He explains this disappearance as being due to molting, the handicapped birds retiring to the seclusion of the marshes, where they are seldom seen. Their diet now becomes



Percentage of young which visited the traps only once during the summer of 1933, as compared with the total number visiting the traps daily during that period

insectivorous, and remains so while they are molting. In September, he continues, the males emerge from the swamp freshly clad, and are soon followed by the females and the immature birds. Then for a considerable period they spend their days in the uplands and their nights in the marsh. Migration begins in the middle of October. The flocks are very large and conspicuous, numbering as many as several tens of thousands of individuals.

To a certain extent the Austin records agree with these conclusions. In late July the males disappear; then the females, and finally the flocks of young also vanish. Occasionally a single bird is seen flying across the dam at the station, or sometimes groups of two or three; but this movement lasts only a few days. The records in middle August tend to be of birds captured in traps bordering the marsh, and these individuals show evidence of molt. The latest midsummer capture during the four years was on the 13th of August. According to Allen's experience, the birds at this season are molting in the swamp, and may be expected back in the uplands in early September when they may be caught in the traps then. But this does not happen on Cape Cod. There is not a single September or October capture at the station in any of the four years. If the local birds were preparing to move south at the time, it is very improbable that some of them should not be caught at the traps, with which they are familiar, and which would be normal places for them to seek food. (Their diet changes to vegetable material after molting.) There had been two hundred and twenty takes in midsummer of one year (1933) and some of these birds, if still in the vicinity, would in all probability have visited the traps in the fall. Our findings give every indication that the local Cape Cod birds have left the breeding-area in July and August, and that the birds seen occasionally in fall and winter are visitors from the mainland to the north.

Allen's conclusions about the August molting habits of the Red-wing were derived from his observations in the Renwick marshes at Ithaca, New York. These swamps, which he describes in detail, are very extensive. The predominating plant is the cat-tail, which, he found, grows to a height of between ninety and one hundred inches by June and remains at that height during July and August. This forms the shelter in which the Red-wings molt and find seclusion.

The swamps of Cape Cod differ considerably from those about Ithaca. Cat-tails are few at the station, and the marsh plants rarely grow taller than four feet, affording but little shelter, as contrasted with those of the Renwick swamp. While the marsh studied by Dr. Allen is an ideal place for birds to remain undisturbed during the molting period, the swamps of Cape Cod seem poorly suited for such a purpose.

TABLE III. RECOVERIES

	Age and Sex when banded	*Date*	*Recovered*	
B234368	jv.	6/14/33	Groton, Mass.	July 10, 1933
A267514	im. ♂	4/20/32	Salem, N. J.	July 21, 1932
B262250	ad. ♀	4/28/34	Salem, N. J.	Aug. 1, 1934
A267513	im. ♂	4/20/32	Salem, N. J.	Aug. 15, 1932
A278000	ad. ♂	5/ 5/32	Chester, Conn.	Aug. 20, 1932
A259043	jv.	7/19/30	Salem, N. J.	Aug. 23, 1930
B215389	jv.	7/31/32	Bridgeport, N. J.	Sept. 9, 1933
B271243		7/30/34	Newbridge, N. J.	Sept. 25, 1934
B209965	jv.	7/27/32	Newport, Del.	Oct. 1, 1932
A277211	jv.	6/23/31	Burlington Swamp, N. J.	Oct. 10, 1931
A273457	ad. ♂	4/22/31	Gloucester County, N. J.	Oct. 19, 1931
A273462	ad. ♂	4/23/31	Kearny Meadow, N. J.	Oct. 29, 1932
A277692	im. ♂	4/25/32	Georgetown, S. C.	Dec. 1, 1933
B224969	ad. ♂	4/16/34[2]	New Bern, N. C.	Dec. 4, 1934
B271336	jv. ♂	8/ 1/34	Summerville, S. C.	Dec. 5, 1934
B262274	ad. ♂	5/15/34	Westover, Md.	Dec. 31, 1934
A277793	im. ♂	5/17/32	Back Bay, Va.	Feb. 27, 1934
B234251	♂	5/12/33	Orleans, Mass.	May 12. 1933

The table (No. III) and accompanying map of recoveries show that Red-wings banded at the station were found at many points along the migration route during the early summer and fall. In July, August, and September these birds were found from Connecticut to southern New Jersey, and not only in one year, but in all four years. The midsummer molt is in progress at this time, and yet station birds are to be found three hundred fifty miles or more from their nesting area.

Considering (1) the numbers of young birds captured but once during the summer; (2) the almost complete absence of Red-wings in September and later at the station; (3) the dates and localities of recoveries; and (4) the nature of the local swamps, we conclude that most of the Cape Cod birds do begin the southward migration in July and August before the summer molt is started, and that they probably complete the molt in swamps after their migration has begun. Unlike the swamps of Cape Cod, many of the marshes on the flight route, such as those found near Newark and Salem, New Jersey, afford suitable protection for molting, comparable to that provided by the marsh at Ithaca. It is probable that some of Allen's molting birds had come to that well-protected swamp at Ithaca from distant places to undergo the molt, and did not migrate farther until autumn.

THE FLIGHT ROUTE

The flight route of the Cape Cod birds is clearly shown by the map of the recoveries received before January, 1935. All the records

[2] Banded at Barnstable, Mass.

are of fall or winter recoveries, so they are comparable. (The Groton recovery is discussed elsewhere.)

The Atlantic coastal swamps extend from Cape Cod along the northern shore of Long Island Sound, around Newark Bay and the Hackensack River west of New York City, and decrease in extent from Raritan Bay to Sandy Hook, where they disappear. (See map.) "From Bay Head south, there are broad expanses of swampy ground bordering the Bays between the mainland and the Barrier Islands. These extend all the way to Cape May."[3] Along the Delaware River from Trenton southward lies another series of marshes, which continues along the margins of the Chesapeake Peninsula. The western shore of Chesapeake Bay is also bordered with extensive swamps, which stretch down the coast to Florida.

All but one of the recoveries came from these swamps. Following the mainland swamps from Cape Cod to the Newark meadows, the birds proceed across the State from Kearny to the Delaware River Valley, instead of following the New Jersey coast. That this is of regular occurrence is indicated by the fact that forty per cent of the recoveries come from this region, and that they are dated at different times during the same season, and during four separate years.

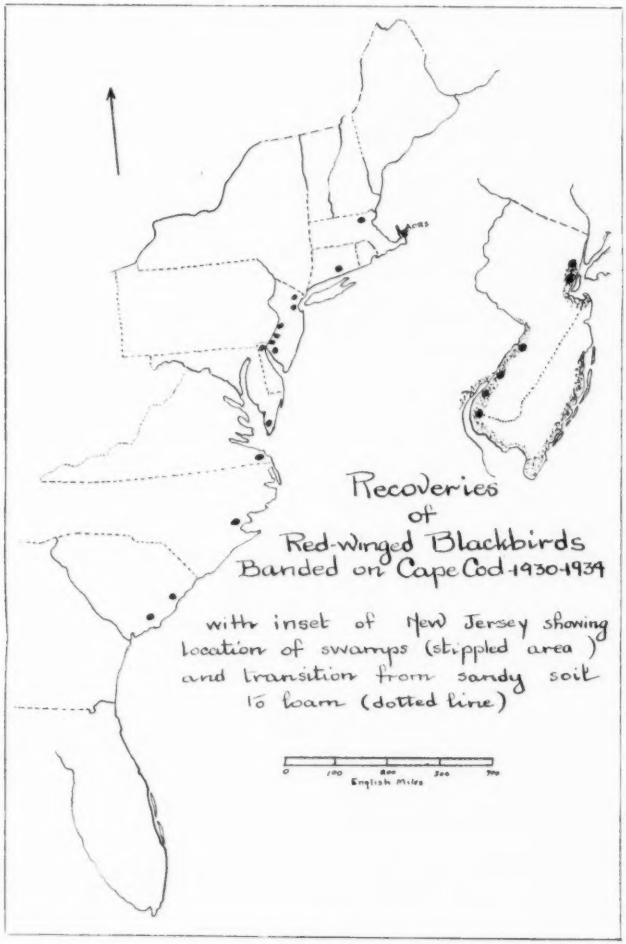
There are several possible reasons for this choice of route: (1) the difference in the soil, as indicated by the dotted line on the inset map, affecting the general ecology; (2) the fact that there is considerable shooting of these unprotected blackbirds at Kearny and Salem; or (3) the fact that the migration path of most landbirds follows this line across the state, except when they are blown to the coast by northwest winds, to concentrate at Cape May.

Red-wings are abundant in the swamps of the shore of the Chesapeake Peninsula, and this is probably the route the Cape Cod birds followed to reach Westover, Maryland, and Back Bay, Virginia.

The most southern records are also the winter ones. The *Bird-Lore* census lists indicate that Red-wings regularly winter in numbers near Georgetown, South Carolina, but also record them from Salem and Cape May, New Jersey. I am informed that all the Red-wings leave Salem shortly after Christmas, and do not winter there. The wintering-grounds of the Cape Cod Red-wings are not definitely known, and it is very possible that the birds of a single summer colony are scattered over a wide area in the winter.

It should be stated that theories based solely upon eighteen recoveries are dependable only if supported by field observations in the regions concerned. These conjectures on the flight route of the Cape Cod Red-wings are supported by the field work of a number of competent observers, but space prohibits the discussion of it. Mr. Ludlow Griscom, to mention but one, did intensive field work in

[3] Quoted from a letter from Mr. Meredith E. Johnson, Assistant State Geologist for New Jersey, who has supplied much information about the topography of New Jersey.



Atlantic-Coast States, Maine South to Florida

New Jersey for many years, and informs me that his observations concur with the conclusions presented here.

THE TRURO COLONY

Between June 14 and 19, 1933, eighty-seven nestlings from thirty nests were banded in the marshes of the Little Pamet River, at Truro, five and a half miles north of the Austin station. The single recovery of one of these birds (B234368) was made on July 10, 1933, by William P. Wharton at Groton, Massachusetts.

There were very strong easterly and northeasterly winds on Cape Cod from the 3d of July until the 6th, which probably blew the young bird recovered at Groton across Cape Cod Bay. The date of recovery is surprisingly early, for the young of the North Eastham colony (Tables I and II) did not leave the swamp until twelve days later.

It is worthy of remark that not one of the eighty-seven Truro birds made an appearance at the station proper during the succeeding fourteen months. The station trap-line extends about one third of the way across the Cape at North Eastham; and as the freshwater swamp on the property is the largest in the vicinity, food is ever abundant. It is reasonable to suppose that most of the Red-wings of the outer Cape visit the property, and that a large majority are captured at least once. If the colonies migrated as units, a restricted route along the ocean shore of the Cape might be postulated to explain the dearth of reports of the Truro birds. However, it has been shown that the members of one colony leave in small unorganized groups rather than as a unit. Further banding of the colony at Truro is needed in order to determine the true solution; definite conclusions cannot be based upon a single report.

THE EASTHAM COLONY

In 1932 twelve nestlings were banded in nests at Minister's Pond, Eastham, three miles south of the station proper, on June 14th, 16th, and 25th. None of these appeared at the headquarters station in 1932, and seven were never heard of again. However, the other five were caught at the station in April and early May, 1933; and two in April, 1934. It is noteworthy that of twelve birds banded *south* of the station in 1932, five (or 43 per cent) were recovered at the station the next year; while not one of eighty-seven birds banded a little farther *north* of the station in 1933 was ever retaken on Cape Cod.

The paucity of repeats from the Minister's Pond birdsl eads to the conclusion that none of these birds which appeared at the station nested there. The question arises whether there may not be a tendency among the returning migrants to wander a distance north of the subsequent breeding-grounds before selecting a nesting-territory. This theory is supported by the notes of N. L. Hackett,

who observed (1913) that when the Red-wings of a small colony in Iowa arrived in March, they stayed in the locality for a week, frequenting the tree-tops, and then disappeared. They returned on May 1st, and sought the meadows, to stake out territory and to mate. All the Austin spring records show that this early foraging is a regular practice, and occurs generally among birds of all ages.

The spring birds may be divided into three groups: those which pass through the property on their way to other localities and do not reappear until after the nesting-season, if at all; those which arrive before the nesting-season, disappear for a period varying from ten days to over a month, and then return to the vicinity to breed; and those very few which remain near the banding-site during the whole spring. It may be concluded, then, that the individuals of a colony are associated with that colony each spring, if there is room, no matter how widely they may be scattered during the winter. The returning birds appear to forage some distance north of the colony's breeding-ground before returning there to nest.

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See also the bibliography Allen's paper (1914).

RECOVERIES OF BANDED BIRDS OF PREY

By FREDRICK C. LINCOLN

THIS series of papers is started through the courtesy of the editor of *Bird-Banding* in making space available so that the most outstanding cases can be brought to the attention of operators of banding stations and others interested in the distribution and migration of birds. This seems particularly desirable since the last Biological Survey publication on returns of banded birds was issued in December, 1927.[1] Since that time the work has grown apace, and the accumulation of data is now so great that it is obvious another "return bulletin" cannot be attempted. If issued along the lines of the last publication on this subject, a volume of at least six hundred pages would be required, which probably would cost about $12,000.

It is believed, however, that the publication of these selected cases will be of much interest to a large body of bird-students, and it also will serve to point out fields that should receive more intensive study. This is well illustrated in the present paper, as, in the final analysis, we know very little about the migration of the birds of prey, and data already at hand indicate that there are features of unusual interest associated with their movements. With this in mind, it is hoped that all banding coöperators will collaborate with the editor of *Bird-Banding* if he calls upon them for elaboration of some of the work used in the records here presented.

While space does not permit discussion of the data, some comments will be added when such seem necessary in order to clarify the record. Only outstanding cases can be presented for each species. The statement in this paper relative to totals of bandings and returns is as of July 1, 1935.

In an examination of these data it will be noted that certain bird-banding coöperators have more or less specialized on the birds of prey, as, for example, Dr. J. F. Brenckle, of Northville, South Dakota, on Burrowing Owls; Frank J. Vejtasa, of Fairdale, North Dakota, on Snowy Owls; E. A. McIlhenny, of Avery Island, Louisiana, and Victor Coles, of Hampton, Virginia, on Black and Turkey Vultures; and Walter R. Salt, of Rosebud, Alberta, and Albert A. Cross, of Huntington, Massachusetts, on a wide variety of both hawks and owls. Still other operators are credited in this tabulation with several valuable records. The marking of birds of prey is of exceptional importance, and every opportunity should be seized to place bands upon either nestlings or adults.

[1] Returns from Banded Birds: 1923 to 1926, *U. S. Dept. Agr. Tech. Bull.* No. 32, pp. 1–96, illus., Dec., 1927.

TURKEY VULTURE. *Cathartes aura*
Banded, 552. Returns, 17

A674818, banded at Battle Creek, Mich., on September 20, 1931, by Dr. L. H. Walkinshaw, was killed (probably) at Plant City, Fla., on December 23, 1932.
A714735, banded at Church Creek, Md., on March 12, 1932, by Frank R. Smith, was shot at Flemington, N. J., on August 15, 1932.
A727958, banded at Hampton, Va., on October 25, 1934, by Victor Coles, was caught in trap (not banding) at Edenton, N. C., on December 28, 1934.
34–703662, banded at Hampton, Va., on January 12, 1935, by Victor Coles, was found dead at Seaford, Del., about April 1, 1935.

BLACK VULTURE. *Coragyps atratus*
Banded, 547. Returns, 10

34–702404, banded at Avery Island, La., on September 13, 1934, by E. A. Mcllhenny, was caught at Gueydan, La., on April 14, 1935.
34–702437, banded at Avery Island, La., on September 13, 1934, by E. A. Mcllhenny, was caught in trap and killed at Gueydan, La., on May 8, 1935.
34–702447, banded at Avery Island, La., on September 13, 1934, by E. A. Mcllhenny, was caught at Gueydan, La., on April 23, 1935.
34–702464, banded at Avery Island, La., on September 13, 1934, by E. A. Mcllhenny, was caught in trap and killed at Gueydan, La., on April 4, 1935. The point of recovery of these four records is about 33 miles west and north of the point of banding.
34–705055, banded at Hampton, Va., on April 13, 1935, by Victor Coles, was killed at Mathews, Va., about June 25, 1935.

GOSHAWK. *Astur atricapillus*
Banded, 34. Returns, 3

A683590, banded at Chester, Mass., on May 19, 1931, by Harry E. Woods, was shot at Towners, N. Y., on November 14, 1931.

SHARP-SHINNED HAWK. *Accipiter velox*
Banded, 114. Returns, 10

315412, banded at Lenox, Mass., on July 4, 1931, by Maurice Broun, was killed at Lodge, Va., on April 17, 1932.
A428011, banded at Leetonia, Ohio, on July 9, 1933, by Paul A. Stewart, was killed at Murfreesboro, Tenn., on December 9, 1933.
A507551, banded at Berrien Springs, Mich., on June 21, 1931, by R. R. Ferguson, was killed at South Bend, Ind., on September 11, 1931.

COOPER'S HAWK. *Accipiter cooperi*
Banded, 214. Returns, 44

554668, banded at Milwaukee, Wis., on July 4, 1932, by Clarence S. Jung, was shot at Parma, Mo., on February 23, 1933.
599858, banded at Toledo, Ohio, on June 28, 1930, by Louis W. Campbell, was killed at Wiggins, Miss., on December 23, 1930.
599865, banded at Toledo, Ohio, on July 4, 1931, by Louis W. Campbell, was captured at Bon Aqua, Tenn., about May 10, 1933.
A562142, banded at Pinckney, Mich., on July 8, 1933, by Paul F. Hickie, was found almost dead at Springfield, Ky., on December 15, 1933.

RED-TAILED HAWK. *Buteo borealis*
Banded, 367. Returns, 85

235859, banded at Verona, Wis., on May 15, 1930, by George Wagner, was killed 4 miles S. W. of Eunice, La., on January 31, 1931.
302126, banded at Jackson, Wyo., on June 22, 1931, by O. J. Murie, was found wounded at Coalcoman, Michoacan, Mexico, on January 11, 1932.
309018, banded at Muscow, Saskatchewan, Canada, on July 3, 1927, by R. H. Carter, was shot at Iota, La., about February 1, 1934.

599831, banded at Tadmore, Saskatchewan, Canada, on June 13, 1929, by Robert M. Blakely, was killed at Victoria, Tex., on February 13, 1932.
655444, banded at Hepburn, Saskatchewan, Canada, on June 23, 1930, by Philip Siemens, was killed at Flatonia, Tex., on December 30, 1930.
A674869, banded at Knowlesville, N. Y., on May 26, 1934, by G. V. Knepper, was killed at Willow Hill, Ill., about November 29, 1934.
A683594, banded at Chester, Mass., on May 24, 1931, by Harry E. Woods, was killed at Lynchburg, S. C., on December 25, 1931.
A721709, banded at Ruthven, Iowa, on July 30, 1933, by Dr. Paul L. Errington, was killed at Colfax, La., on January 10, 1934.
A724803, banded at Carmangay, Alberta, Canada, on July 1, 1933, by Dr. and Mrs. J. E. Horning, was found dead 10 miles north of Kimball, Nebr., on January 20, 1934.
B661937, banded at Williamston, Mich., on May 13, 1933, by Prof. P. F. English, was killed at Greensboro, Ala., on December 26, 1933.
C622262, banded at Stenen, Saskatchewan, Canada, on June 14, 1933, by Mrs. F. Wickenkamp, was killed at Buffalo Bayou, Tex., on October 15, 1933.
C629877, banded at Fairfield, Iowa, on May 30, 1934, by Carl Welty, was killed at Cuero, Tex., on December 30, 1934.

RED-SHOULDERED HAWK. *Buteo lineatus*
Banded, 191. Returns, 38

210855, banded at Hall, N. Y., on April 1, 1927, by H. A. Southerland, was retaken at North Side, N. C., in March, 1931.
210898, banded at H. Beadel Plantation, Leon County, Fla., on May 7, 1924, by C. O. Handley and H. L. Stoddard, was killed at Tallahassee, Fla., on April 18, 1930. This bird was banded as a fledgling and was killed on its nest.
226876, banded at East Lansing, Mich., on February 22, 1930, by Dr. Miles D. Pirnie, was shot at Dayton, Ohio, about January 10, 1931.
559185, banded at Berrien Springs, Mich., on June 15, 1931, by Roy R. Ferguson, was killed at Morganfield, Ky., about November 25, 1934.
660552, banded at Huntington, Mass., on June 14, 1931, by Albert A. Cross, was killed at Freeman, N. C., on January 4, 1934.
A582565, banded at Sherman, Mo., on July 22, 1934, by L. M. Weber, was found wounded at Lavinia, Iowa, on August 24, 1934.
B664473, banded at Demarest, N. J., on May 31, 1932, by B. S. Bowdish, was killed in Lee County, N. C., about November 10, 1932.
B664991, banded at Rhinebeck, N. Y., on June 11, 1932, by M. R. Knapp, was killed at East Bend, N. C., on February 1, 1933.

BROAD-WINGED HAWK. *Buteo platypterus*
Banded, 59. Returns, 6

660558, banded at Huntington, Mass., on July 10, 1932, by Albert A. Cross, was killed 8 miles west of Winchester, Va., on September 8, 1932.
A675276, banded at Huntington, Mass., on July 5, 1930, by Albert A. Cross, was caught at Atkins, Mich., on August 28, 1930.
B664997, banded at Rhinebeck, N. Y., on June 10, 1933, by Maxwell R. Knapp, was killed at Bloxom, Va., on February 14, 1934.

SWAINSON'S HAWK. *Buteo swainsoni*
Banded, 99. Returns, 12

388328, banded at Davidson, Saskatchewan, Canada, on May 1, 1932, by Bert Lloyd, was shot at Anson, Tex., on November 24, 1932.
656405, banded at Vernon, Tex., on June 30, 1928, by George E. Maxon, was captured at Olustee, Okla., about October 2, 1934.
A605202, banded at Dollard, Saskatchewan, Canada, on June 26, 1932, by Charles F. Holmes, was killed at Stacey, Mont., on September 28, 1932.
A605212, banded at Dollard, Saskatchewan, Canada, on August 12, 1934, by Charles F. Holmes, was shot at Clinton, Okla., on October 12, 1934.

AMERICAN ROUGH-LEGGED HAWK. *Buteo lagopus*
Banded, 30. Returns, 5

B670746, banded at Waukegan, Ill., on December 11, 1933, by William I. Lyon, was found dead at Shelby, Ind., about December 16, 1933.

FERRUGINOUS ROUGH-LEGGED HAWK. *Buteo regalis*
Banded, 87. Returns, 15

A709877, banded at Rosebud, Alberta, Canada, on July 8, 1930, by Walter R. Salt, was caught in steel trap at Tatum, New Mexico, on October 27, 1931.
A709896, banded at Rosebud, Alberta, Canada, on June 17, 1933, by Walter R. Salt, was shot at Midland, Tex., on November 10, 1933.
A717512, banded at Beynon, Alberta, Canada, on June 16, 1934, by Walter R. Salt, was found dead at Hudson, Colo., on March 15, 1935.
A717523, banded at Rosebud, Alberta, Canada, on June 19, 1934, by Walter R. Salt, was caught in coyote trap at Brea, Calif., about November 15, 1934.
A717525, banded at Rosebud, Alberta, Canada, on June 19, 1934, by Walter R. Salt, was found dead at Hugoton, Kans., about December 30, 1934.

BALD EAGLE. *Haliæetus leucocephalus*
Banded, 57. Returns, 8

299451, banded at Ephraim, Wis., on June 29, 1928, by Prof. George Wagner, was caught in trap at South Boardman, Mich., on December 15, 1933.
303351, banded at Delaware City, Del., on May 5, 1928, by Benjamin C. Hiatt, was captured alive in trap at Olivet, Md., on February 4, 1931.
322057, banded at Grand Rapids, Mich., on May 20, 1928, by Ben East was found wounded (later released and able to fly) at Roscommon Mich., on October 22, 1934.

MARSH HAWK. *Circus hudsonius*
Banded, 681. Returns, 129

223901, banded at Dawsetts Marsh, Washtinaw County, Mich., on July 11, 1924, by Walter E. Hastings, was killed at Thayer, Kans., about March 7, 1933.
226356, banded in Anoka County, Minn., on June 25, 1933, by W. J. Breckenridge, was killed at Windsor, Mo., on October 31, 1933.
233458, banded at Berlin Center, Ohio, on June 29, 1930, by Ernest W. Vickers, was killed in Wharton County, Tex., on December 28, 1930.
453015, banded at Beaverhills Lake, Alberta, Canada, on August 25, 1933, by William Rowan, was killed 40 miles west of Oklahoma City, Okla., on October 31, 1934.
542479, banded at Andover, N. Y., on June 18, 1932, by C. H. Watson, was killed (probably) at Waco, Tex., on September 17, 1932.
542951, banded at Montreal, Quebec, Canada, on July 16, 1930, by W. J. Low, was killed at Montezuma, N. Y., on October 9, 1930.
599863, banded at Toledo, Ohio, on July 1, 1930, by Louis W. Campbell, was killed (probably) 5 miles south of Kingston, Ga., on October 10, 1930.
656129, banded at Dayton, Ohio, on June 15, 1930, by Louis B. Kalter, was wounded 4 miles from Harlingen, Tex., on January 12, 1931.
656823, banded at Antwerp, Ohio, on July 6, 1930, by O. E. Ehrhart, was killed 8 miles east of Comanche, Tex., on September 4, 1930.
702951, banded at Minneapolis, Minn., on June 29, 1929, by Gustav A. Swanson, was killed 2 miles north of Mill Creek, Okla., on February 2, 1931.
703902, banded at Pottageville, York County, Ontario, Canada, on July 10, 1932, by Charles H. D. Clarke, was killed at Fulton, Mo., on November 17, 1932.
A502414, banded at Wolfville, Nova Scotia, Canada, on July 25, 1932, by Ronald W. Smith, was killed at Selbyville, Del., on November 14, 1933.
A544174, banded at Rosebud, Alberta, Canada, on July 4, 1933, by W. R. Salt, was shot at Oak Harbor, Wash., on August 31, 1933.
A568773, banded at Hyas, Saskatchewan, Canada, on July 29, 1933, by William L. Wotherspoon, was killed at Beaumont, Tex., about December 20, 1934.

A572815, banded at Rosebud, Alberta, Canada, on July 16, 1933, by Walter R. Salt, was caught in coyote trap at Brice, Brisco County, Tex., on December 22, 1933.

A609865, banded at Zion, Ill., on June 29, 1931, by C. E. Holcombe, was killed at Ashburn, Ga., on March 2, 1933.

A625374, banded at North Lima, Ohio, on June 21, 1931, by Edgar L. Stephenson, was killed at Muldrow, Okla., on August 21, 1931.

A626612, banded at Madison, Wis., on June 11, 1930, by Prof. George Wagner, was killed at Pascagoula River Marshes, Jackson County, Miss., about December 10, 1932.

A685618, banded at Valeport, Saskatchewan, Canada, on June 28, 1932, by Fred Bard, was killed at Apache, Okla., on October 13, 1932.

A697063, banded at Argusville, N. D., on July 13, 1931, by Gale W. Monson, was retaken at Guantanamo, Cuba, about January 16, 1932.

A721706, banded at Anoka, Minn., on June 28, 1933, by Dr. Paul L. Errington, was caught in Calloway County, Ky., about January 25, 1935.

B607797, banded at Niles Center, Ill., on June 26, 1932, by William I. Lyon, was killed at Vernon, Tex., on September 12, 1932.

B618505, banded at Lewiston, Ohio, on July 9, 1931, by John H. Chase, was caught at Lake Crystal, Minn., about July 1, 1935.

B646388, banded at Rosebud, Alberta, Canada, on July 8, 1933, by Walter R. Salt, was found dead at Casa Grande, Ariz., about November 18, 1933.

B652688, banded at Aberdeen, S. D., on July 12, 1933, by F. W. George, was killed (probably) at Littlefield, Tex., about November 30, 1933.

B664960, banded at Berrien Springs, Mich., on June 10, 1933, by Roy Ferguson, was found dead at Harmon, Okla., on April 28, 1934.

34–508006, banded at Glenevis, Alberta, Canada, on June 22, 1934, by Dr. and Mrs. J. E. Horning, was killed at Keuterville, Idaho, on September 20, 1934.

34–508022, banded at Glenevis, Alberta, Canada, on June 22, 1934, by Dr. and Mrs. J. E. Horning, was caught at Blythe, Calif, about February 10, 1935.

34–509952, banded at London, Ontario, Canada, on July 7, 1934, by J. C. Higgins, was killed at Marianna, Ark., on November 12, 1934.

OSPREY. *Pandion haliaëtus*

Banded, 637. Returns, 46

ABBA–26584, banded at Gardiner's Island, N. Y., on June 19, 1914, by H. H. Cleaves, found dead at Gardiner's Island, N. Y., on June 1, 1935. This bird was banded as a nestling. Its recovery makes the greatest longevity record thus far reported for any bird.

ABBA–26591, banded at Gardiner's Island, N. Y., on June 15, 1914, by H. H. Cleaves and H. K. Decker, was killed at West Durham, N. C., on April 4, 1930. Banded as a nestling.

202392, banded at Providence, R. I., on June 20, 1924, by H. E. Childs, was shot at Lafayette, R. I., on July 16, 1932.

661055, banded at Avalon, N. J., on August 27, 1929, by John T. Emlen, skeleton found in Burke County, Ga., fall 1930.

A700308, banded at Avalon, N. J., on August 10, 1929, by C. Brooke Worth, caught in steel trap at Rockledge, Fla., on January 2, 1932.

A700412, banded at Gardiner's Island, L. I., N. Y., on July 3, 1931, by Le Roy Wilcox, was caught in steel trap (died) 8 miles north of Hancock, Md., on Tonolway Creek, Thompson Twsp., Pa., on September 27, 1931.

A719002, banded at Slaughter Beach, Del., on April 25, 1932, by Herbert Buckalew, was shot at Milk River, Jamaica, B. W. I., on March 10, 1933.

A719077, banded at Slaughter Beach, Del., on April 26, 1934, by Herbert Buckalew, was killed at El Mojan-Estado, Zulia, Venezuela, South America, on June 28, 1935.

A721063, banded at Avalon, N. J., on August 20, 1933, by Mr. and Mrs. J. A. Gillespie, leg with band found at Edenton, N. C., about May 1, 1934.

A727056, banded at Orient Point, L. I., N. Y., on July 23, 1933, by Marie V. Beals, was shot while attempting to alight on the mast of a ship 73 miles east of Cape Hatteras, N. C., on October 9, 1933.

34–701204, banded at Smith's Point, Va., on June 19, 1934, by W. Bryant Tyrrell, was found crippled at Beaufort, N. C., about October 1, 1934.

DUCK HAWK. *Falco peregrinus*
Banded, 55. Returns, 10

A701032, banded at Mohonk Lake, N. Y., on June 18, 1929, by Albert K. Smiley, Jr., was shot at Grand Island, Nebr., on September 26, 1929.

B661961, banded at Scout Camp, Treasure Island, N. J., on September 3, 1932, by Joseph V. Sparmaker, was caught at McClure, Ill., on September 22, 1932.

C629585, banded at Rosebud, Alberta, Canada, on July 4, 1933, by Walter R. Salt, was shot at Butte, N. Dak., on September 22, 1933.

PIGEON HAWK. *Falco columbarius*
Banded, 41. Returns, 5

A416122, banded at Rosebud, Alberta, Canada, on July 8, 1930, by W. R. Salt, was shot at Gila Valley near Stafford, Ariz., on December 12, 1930.

A420558, banded at Rosebud, Alberta, Canada, on July 6, 1931, by Walter R. Salt, was killed at Tucson, Ariz., on January 28, 1933.

SPARROW HAWK. *Falco sparverius*
Banded, 637. Returns, 46

368572, banded at Babson Park, Mass., on June 14, 1929, by Lester W. Smith, was killed at Allsbrook, S. C., on February 19, 1931.

A443939, banded at Norristown, Pa., on June 11, 1932, by R. J. Middleton, was killed in Nash County, N. C., on October 24, 1932.

A462120, banded at Rosebud, Alberta, Canada, on July 5, 1933, by Walter R. Salt, was found dead at Proctor, Tex., on March 27, 1934.

C338832, banded at Flushing, L. I., N. Y., on June 23, 1934, by Arthur F. McBride, was killed 7 miles west of Pinewood, S. C., on January 2, 1935.

BARN OWL. *Tyto alba*
Banded, 937. Returns, 115

223277, banded at Oconomowoc, Wis., on July 22, 1929, by Irving J. Perkins, was caught in steel trap at Tuckerman, Ark., on May 23, 1932.

232151, banded at Horsham, Pa., on June 25, 1929, by Mrs. Florence C. Griscom, was captured at Boston, Ga., on January 8, 1931.

496906, banded at Quincy, Ill., on June 7, 1930, by T. E. Musselman, was caught in steel trap at Bassfield, Miss., on December 11, 1930.

599803, banded at Riverton, N. J., on June 13, 1929, by John T. Emlen, Jr., was caught in a "hawk trap" at Berea, N. C., on November 15, 1930.

656951, banded at Brainard, Nebr., on April 22, 1934, by Mr. and Mrs. A. A. Misek, was killed near Houston, Tex., on February 3, 1935.

B622022, banded at Springdale, Hamilton County, Ohio, on June 11, 1932, by C. J. Goetz, was found dead at Albany, Ga., on November 8, 1933.

B622023, banded at Springdale, Ohio, on June 11, 1932, by C. J. Goetz, was shot at Carlisle, Ark., on October 18, 1932.

B622025, banded at Springdale, Ohio, on June 11, 1932, by C. J. Goetz, was shot at Theodore, Ala., on November 20, 1932.

B664405, banded at Leetonia, Ohio, on May 22, 1933, by Paul A. Stewart, was killed (probably) at Naples, Fla., on January 30, 1934.

B664406, banded at Leetonia, Ohio, on July 2, 1933, by Paul A. Stewart, was shot at Amherstburg, Ontario, Canada, on May 23, 1934.

B674207, banded at Chilmark, Mass., on July 3, 1932, by George D. Eustis, was caught at Schwenkville, Pa., about August 29, 1933.

SCREECH OWL. *Otus asio*
Banded, 1270. Returns, 153

209911, banded at Ashton, Iowa, on December 16, 1928, by James E. Townsend, was caught (died of cold) at Tabor, S. Dak., in January, 1930. The distance between points of banding and recovery is nearly 100 miles.

290939, banded at Claremont, Calif, on May 20, 1928, by E. L. Sumner, Jr., was found dead at La Verne, Calif., on May 20, 1931, about 35 miles away.

A510850, banded at Glenwood, Minn., on March 25, 1932, by James V. Porter, was found dead in Palo Alto County, near Emmetsburg, Iowa, on December 20, 1932, the bird having covered a distance of nearly 200 miles.

A600862, banded at La Verne, Calif., on March 7, 1929, by Rudolph Fischer, was shot at North Pomona, Calif, about July 1, 1930, about 360 miles south.

B652681, banded at Aberdeen, S. Dak., on June 20, 1933, by F. W. George, was caught in sheep barn at Havana, N. Dak., on October 25, 1933, a distance of more than 50 miles.

GREAT HORNED OWL. *Bubo virginianus*
Banded, 306. Returns, 54

301328, banded at Indian Head, Saskatchewan, Canada, on May 5, 1928, by George Lang, was shot 5 miles north of Qu'Appelle, Saskatchewan, Canada, on June 19, 1935.

661183, banded at Muscow, Saskatchewan, Canada, on May 22, 1932, by John R. Carter, was shot at Moose Mountain Indian Reserve, near Manor, Saskatchewan, Canada, about November 3, 1933. The distance covered by this bird was about 115 miles.

SNOWY OWL. *Nyctea nyctea*
Banded, 81. Returns, 16

237336, banded at Fairdale, N. Dak., on March 9, 1930, by Frank J. Vejtasa, was retaken at Crooked Gutway, Fort George, Quebec, Canada, about September 10, 1932.

237339, banded at Fairdale, N. Dak., on April 6, 1930, by Frank J. Vejtasa, was shot at Horndean, Manitoba, Canada, on April 20, 1931.

237340, banded at Fairdale, N. Dak., on April 17, 1930, by Frank J. Vejtasa, was found dead at Fisher Branch, Manitoba, Canada, on July 21, 1930.

320672, banded at Fairdale, N. Dak., on April 7, 1931, by Frank J. Vejtasa, was killed at St. Laurent, Manitoba, Canada, on April 30, 1931.

320674, banded at Fairdale, N. Dak., on April 7, 1931, by Frank J. Vejtasa, was captured alive at Meleb, Manitoba, Canada, about May 23, 1932.

BURROWING OWL. *Speotyto cunicularia*
Banded, 576. Returns, 34

A515484, banded at Northville, S. Dak., on June 27, 1931, by J. F. Brenckle, was shot near Edmond, Okla., on December 12, 1932.

A515489, banded at Northville, S. Dak., on June 27, 1931, by J. F. Brenckle, was captured 4 miles north of Gunter, Tex., on January 7, 1932.

A519449, banded at Northville, S. Dak., about July 1, 1931, by J. F. Brenckle, was found badly injured at Royal, Nebr., about October 1, 1931.

A544057, banded at Northville, S. Dak., on July 10, 1932, by J. F. Brenckle, was caught at Willow, Okla., about April 4, 1933.

A544070, banded at Northville, S. Dak., on July 10, 1932, by J. F. Brenckle, was shot at Columbia, S. Dak., on April 24, 1934.

A544093, banded at Northville, S. Dak., on June 21, 1933, by J. F. Brenckle, was killed during a hail storm at Snyder, Tex., on April 3, 1935.

A568829, banded at Northville, S. Dak., on June 24, 1933, by J. F. Brenckle, was caught at Kamrar, Iowa, about April 21, 1934.

A568860, banded at Northville, S. Dak., on July 18, 1933, by J. F. Brenckle, was killed at Lott, Tex., about January 20, 1935.

A568894, banded at Northville, S. Dak., on July 18, 1933, by J. F. Brenckle, was killed at Gasoline, Tex., on October 11, 1933.

A568899, banded at Northville, S. Dak., on July 18, 1933, by J. F. Brenckle, was killed (probably) at Flatonia, Tex., about October 15, 1934.

B622725, banded at Jamestown, N. Dak., on July 16, 1933, by Glenn L. Berner, was killed (probably) 5 miles west of Moore, Tex., on December 26, 1934.

BARRED OWL. *Strix varia*
Banded, 100. Returns, 17

662514, banded at Prairie du Sac, Wis., on May 24, 1931, by George Wagner, was captured at Galena, Ill., on November 28, 1931. The distance covered by this bird was about 70 miles.

LONG-EARED OWL. *Asio wilsonianus*
Banded, 255. Returns, 9

208816, banded at Martha's Vineyard, Mass., in 1927, by Allan Keniston, was found wounded at Englewood, N. J., on April 19, 1933.

B661987, banded at Escondido, Calif., on April 22, 1934, by Fred N. Gallup, was shot at Corbeil, Ontario, Canada, on October 9, 1934. This is one of the most unusual records thus far obtained. It has been thoroughly checked.

C616735, banded at St. Johns, Mich., on May 14, 1933, by Frank C. Bishop, was captured at Abitibi, Quebec, Canada, on September 4, 1933.

C629600, banded at Rosebud, Alberta, Canada, on July 4, 1933, by Walter R. Salt, was shot at Layton, Utah, on February 2, 1935.

SHORT-EARED OWL. *Asio flammeus*
Banded, 71. Returns, 2

A685603, banded at Tregarva, Saskatchewan, Canada, on July 18, 1931, by Fred G. Bard, was shot at Rice Lake, Minn., on October 23, 1931.

SAW-WHET OWL. *Cryptoglaux acadica*
Banded, 69. Returns, 1

439545, banded at Sound Beach, Conn., on January 15, 1929, by Joseph J. Hickey, was found dead at Kittery, Maine, about February 16, 1930.

Biological Survey, Washington, D. C.

GENERAL NOTES

Apparent Intelligence of the Sparrow (*Passer d. domesticus*) **and Starling** (*Sturnus v. vulgaris*) **at the Trap.**—During the autumn of 1935 I spent a fortnight with members of the Midlothian Ornithological Club at their trapping station on the Isle of May, Firth of Forth, Scotland. The trap, situated at one end of the central valley of the island, is in shape a huge funnel of wire netting with an entrance measuring some 10 by 36 feet, the side netting extending a great deal farther than this.

Excluding some vegetables in the lighthouse gardens, the only cover on the island is around the entrance to the trap. This is all artificial and is so arranged that it is thickest in the mouth and for the first 18 feet inside the trap. Migratory and resident Passerine birds seek this cover in preference to anywhere else on the island, and, when disturbed from the right direction, are easily induced to move up into the thicker cover, where they find themselves in the trap and, frightened by the human figures, attempt to escape through the apparent exit at the other end—a sheet of glass.

The breeding Passerines on the island are Sparrow, Starling, Blackbird (*Turdus m. merula*), Song Thrush (*Turdus e. ericetorum*), Pied Wagtail (*Motacilla alba yarrellii*), Meadow Pipit (*Anthus pratensis*) and Rock Pipit (*Anthus spinoletta petrosus*), and, except for the first two, these, with the passage-migrant species, always flew away from the disturbance into the cover and so into the trap. But I noted that the Sparrows and Starlings almost invariably flew over or around the entrance, which meant that they had to fly upwards for ten feet.

We also tried laying a trail of bait (bread and odd scraps) right into the trap, and this attracted inside many birds of various kinds. A concerted and noisy rush would then be made, and though this would be successful with most of the species—both migrant and resident—it was seldom that the Sparrows or Starlings lost their heads. Without hesitating, they would fly straight *towards* the noise and danger and, dodging our uplifted hands, would make good their escape as soon as they were out from beneath the roof of netting. Their behavior made a most marked contrast with that of the other birds in the trap, who always flew *away* from the danger or else attempted to escape through the netting at the side.

The other resident species never solved this trick. Nor, of course, did the passage-migrant species.

One or two Sparrows and Starlings would be caught most days, but these were usually the same individuals. This had nothing to do with immaturity, but it was merely that their sense of cunning (for lack of a better word) was not so keenly developed as it was in the rest of their kind and, occasionally, they would panic and fly away from the danger instead of towards it.

If killing, instead of banding, had been the object of the captures and attempted captures, this would have been a good example of the working of natural selection.

It would be interesting to hear whether results from other stations with similar traps bear out the idea that the Sparrow and Starling might have a cleverness above the average for small Passerines. Though the great success of these two species, both in their own country and in North America, is no doubt largely due to such factors as their omnivorous habits, wide choice of nesting-sites, many young per season, and perhaps general hardiness and scarcity of enemies, it would seem, from my Isle of May observations, that intelligence might also play a part.—L. S. V. Venables, Tilford, Surrey, England.

Additional Records of Protocalliphora.—Through the coöperation of a number of Ohio ornithologists the Ohio State Museum has been able to secure a good series of specimens of *Protocalliphora*, dipterous parasites of nestling birds, and at the same time has added a number of interesting host records:

Prairie Warbler (*Dendroica d. discolor*), "Neotoma," Hocking County, Ohio, June 9, 1934, Louis W. Campbell and Charles F. Walker. Four nestlings left the nest when it was discovered. Thirteen fully grown maggots were found in the nest-material, from the puparia of which the flies emerged on June 22.

Worm-eating Warbler, (*Helmitheros vermivorus*) Washington Township, Lawrence County, Ohio. A nest containing four well-grown young was found on July 1, 1934, by Charles F. Long and the writer. On July 8th, after the young had left, the nest was collected by Mr. Long and six specimens of *Protocalliphora* were reared from it.

Carolina Wren (*Thryothorus l. ludovicianus*), Washington Township, Jackson County, Ohio. Twenty puparia were found in the nest July 28, 1935. Most of the flies had hatched at the time the nest was collected by Mr. C. F. Long, but three flies were reared from the remaining puparia; one puparium failed to hatch and four were parasitized by a minute chalcid parasite, presumably *Mormoniella*. Five wren nestlings apparently survived the attacks of the twenty maggots.

Yellow-breasted Chat (*Icteria v. virens*), Franklin County, Ohio, September 8, 1935, Floyd B. Chapman. Thirty flies emerged September 18th. The record is noteworthy in several respects: a late date for nesting Chats, a late date for the parasites, and the number of parasites. This and the three preceding records, seem to be new host records for *Protocalliphora*.

Mississippi Song Sparrow (*Melospiza melodia beata*), Columbus, Ohio, June 6, 1935, Mrs. Margaret Morse Nice. Four nestlings. On June 10th there were seven puparia and two larvæ in the paper sack in which the nest was placed. The last two larvæ pupated on June 10th and 11th, and the flies emerged over a period of four days, June 20th–23d.

Our observations indicate that the attacks of this parasite by no means always result in appreciable injury to the hosts. One of the nestling Prairie Warblers was captured and carefully examined. It appeared to be perfectly healthy and in good

flesh, with no visible marks of injury, an astonishing state of affairs in view of the fact that the bird and its three nest-mates had had to withstand the attack of thirteen large blood-sucking maggots. The young Worm-eating Warblers also appeared healthy and vigorous, but we did not examine them in the hand for fear of frightening them from the nest prematurely.

Mrs. Nice has full notes on the history of the young Song Sparrows, including daily weights. She reports that while slow in growth at first, the nestlings later caught up in weight, so that there was little difference between them and other unparasitized (presumably) nestlings.

I am greatly inclined to the opinion that the *Protocalliphora* larvæ normally leave the nest at maturity, dropping to the ground to pupate, unless prevented from doing so, as in the case of cavity-nesting birds or birds which use mud in the construction of the nest, like the Robin and the Barn Swallow. In the case of the Song Sparrow nest, none of the puparia or larvæ were in the nest-material, but were lying outside of it in the paper sack.

It will be noted that the parasites in the nest of the Prairie Warbler were taken before the young birds would normally have left the nest; the nest of the Worm-eating warbler was already on the ground; while the nest of the Carolina Wren was in a metal receptacle which prevented the escape of the larvæ. On the other hand, I have examined dozens of abandoned "open" nests, all with negative results. This theory, if correct, would explain the high percentage of parasitism, as shown by the records, of hole-nesting birds, and the relatively few records of *Protocalliphora* for birds nesting in the open. As a matter of fact, I strongly suspect that the latter are actually parasitized as heavily as the former.—Edward S. Thomas, Ohio State Museum, Columbus, Ohio.

Two White-throated Sparrow Returns.—Great was the surprise of my fire-maker one morning in November last when on opening the kitchen stove to kindle it she saw a bird fly out. The bird fluttered to a window and was easily caught, when it proved to be White-throated Sparrow 34–143765 banded in January, 1935. The bird was put into a cage and left on the porch for my inspection. When I appeared I found that a cat had knocked over the cage and was trying to get the bird, but I arrived in time and released the bird unhurt, although very sooty and, I hope, fully resolved to explore no more stove pipes.

Number A101873 made a return less dramatic but very instructive as to the danger of making assumptions about birds that fail to return to the traps. This one was found dead on November 8, 1935, near a screened porch, having probably flown against the screen. The records showed it had been banded April 21, 1929, had returned October 26, 1929, October 27, 1930, and never since. This is my longest record on this species, but the bird had not entered my traps for five years, although quite probably wintering regularly on the place. The bird was at least seven years old.—Marion A. Boggs, Waynesville, North Carolina.

Known History of Eastern Phœbe B127877.—Since female Phœbes (*Sayornis phœbe*) are rather consistent birds in returning in successive years to their former year's nest-site, as I and others have proved by banding, among my records there stands out preeminently that of female No. B127877, banded on June 11, 1931. She was trapped in a Chardonneret trap by using the young as an enticement. In the following years she would not enter this trap or any trap and had to be taken at night while on the nest by a the use of strong light.

In 1931 she reared one brood of four at the iron-railed red bridge just below our garden, where Phœbes have nested for years on the central steel cross-stripping that supports the structure in the middle. The young were also banded, and they left the nest June 11th, after which date neither young nor adults were positively identified in the vicinity that year. But after they had gone, another unbanded pair relined their nest and reared a brood, which flew on July 29th. On June 3, 1932, B127877 was taken as a return-1 at this bridge when her second brood of five young were half feathered, and on July 14th her second brood of four were

banded. Throughout the 1933 nesting season nothing was seen of B127877. Instead, another pair (possibly the pair that reared a late brood the preceding season) settled at the red bridge, and possibly kept B127877 and her mate away if they did come back. This unbanded female was accordingly caught and banded on May 21st when incubating five eggs, and she reared two broods. On June 7, 1934, B127877 once more came back. Of her first seasonal brood three were banded on May 28th when partly feathered, and there were two addled eggs flattened into the nest. The second brood of the year was not banded. But the third brood, of four, were tagged on July 25th. Within a few days of her mate's arrival the following spring, this female returned again; and on June 7, 1935, was taken as a return-3, at least five years old. She again selected the habitual spot—no doubt because it was the most convenient spot on the eastern side of the bridge and an accustomed one—and a brood of five, of which one died in the nest, were reared and banded. After a period of rest in which she relined the nest for a second attempt and was ready to lay another clutch of eggs, an ignorant lad without realizing the harm in his act, took the nest for his nest collection. B127877 and her mate immediately disappeared.

In all, after over four years of nesting, this female and her mate, or mates, have reared to a flying stage twenty-eight young; only two eggs have been addled, and one youngster died. It has been noticed at this nest and others that the first nestings are invariably pretty free from parasitic pests, but second nestings may be literally overrun with mites and possible third broods will often be forced prematurely into leaving the nest. I am of the opinion that mites invariably prevent Phœbes from raising a third brood, which they might easily do, coming back early each spring, as is habitual with the species. Destruction of infested nests, in my experience, usually tends to drive the breeding birds to a new location, but powdered sulphur scattered under the old nest-lining, soon after the young have flown, is a feasible eradicant.

At the close of the 1935 breeding season Phœbe B127877 was at least five years old; how much older she may be is unknown, since she was an adult when banded and might have nested at the red bridge in former years. However, her record outmatches by two years any of the other female Phœbes recorded at my banding station.—Lewis O. Shelley, East Westmoreland, New Hampshire.

Sparrow Migration at Shirley, Massachusetts.—Since the location of my farm in Shirley, Massachusetts, seems to be in the line of migration of the White-throated and other sparrows, I decided this fall (1935) to make an extra effort to trap as many as possible. A year ago I had developed a very simple and pretty effective sparrow trap, one which would apparently catch four or five sparrows to every one caught by the Government Sparrow Trap. During the summer I made about thirty of these traps, and when the sparrows arrived, the traps were set at distances from each other varying from one hundred feet to two hundred or more yards, depending on the immediate surroundings. I made the rounds in my Ford truck, the total distance per trip being about two miles. Every trap was near the edge of second-growth woods or brush, with the exception of three which were probably seventy-five feet distant from such cover in a weed-grown young apple orchard. These traps caught very few birds.

From the outset the chipmunks were a serious pest. I trapped between fifteen and twenty of them, and probably an equal number were there but were not caught. They were responsible, I feel sure, for the deaths of several birds in the traps. They probably ate up three quarters of the grain I put out in some of the best locations, and I do not think the sparrows enter the traps freely when the chipmunks are there first. For some time my route was also patrolled by a big wild black tom-cat. This meant that day after day one or several traps would have the exit doors knocked away and there would be no sparrows waiting for me. It was not until the end of the migration that the cat met his Waterloo. The grain I used was two parts fine cracked corn and one part golden millet. In a few traps I put sunflower seeds occasionally. These were the means of capturing five Blue Jays.

I doubt if the grain mixture is the best possible. The cat and the chipmunks made me want to give up the battle sometimes. I thought the traps were the very best until Mr. Wharton developed what appears to be a much better one. On October 7th, 130 birds were trapped, 62 being new ones and on the four busiest days, October 5–8, 397 birds were trapped and 207 new ones were banded. The total new birds from September 23d, when the first White-throat was caught, until October 16th, when only one new one was banded and we had to take in the traps, was 560, of which 318 were White-throats. Of the remainder there were 123 Song Sparrows, 2 Swamp Sparrows, 9 Lincoln's Sparrows, 20 Field Sparrows, 9 Chipping Sparrows, 17 White-crowned Sparrows (2 adults), 14 Juncos, 27 Savannah Sparrows, 4 Vesper Sparrows, 12 Towhees, 3 Catbirds, 1 Brown Thrasher, and 1 Blackpoll Warbler. There were fewer Field and Swamp Sparrows about than a year ago. Chipping Sparrows were numerous but they did not enter the traps readily. One Swamp Sparrow had an almost perfect "cross-bill," but had evidently solved the food-gathering problem and was in very good health. It did not appear to me that more than the usual number of sparrows were on migration through my station.

The peak of the White-throat migration was on October 7th, when 47 were banded, their numbers having gradually increased since September 23d, from which date they gradually decreased to October 16th. 171 of them repeated, that is, 53.7 per cent. Only two stayed as long as two weeks.

The Song Sparrows were always well scattered over the route and did not make a very great showing at any time. In the last week of September 27 were banded, in the first week of October, 51, and in the second week of October there were 30 new ones. This may indicate a migratory peak from October 1st to 7th, but I do not feel that it furnishes conclusive proof. One of the Song Sparrows caught had been banded as a juvenile on August 7th in Groton, about six miles away, by Mr. W. P. Wharton. There were no other returns or recoveries for any of the species.

In order to get an adequate number of returns from sparrows it is necessary to band large numbers. It seems as if others ought to be able to plan an intensive campaign in favorable territory for the few weeks necessary by operating a similar trap-line.—E. M. Davis, Winter Park, Florida.

A Tree Swallow Rears a Cliff Swallow.—Most of the young Tree Swallows (*Iridoprocne bicolor*) had left the nest-boxes when, on June 30, 1935, a young Cliff Swallow (*Petrochelidon lunifrons*) was brought to me, then about two-thirds feathered. The only thing I could do with it, with a hope of saving its life, was to put it in with a nestful of young Tree Swallows, and this was done at Box 6 with a brood that had been banded on the 25th and, at this date (30th), were completely feathered. It was mid-afternoon when the experiment was tried. As an immediate result, the young swallows flew from the box after some ten minutes had elapsed. When the young Tree Swallows were returned to their nest, they again left, and remained in the near-by shrubbery at least that night. The female, 34–51591, did not find the young Cliff Swallow a sufficient reason to leave the nest but accepted the addition. When the Cliff Swallow was introduced into the box with the young Tree Swallows, they became uneasy and shifted about in nervous excitement that found its culmination in their leaving. The female fed the Cliff Swallow and successfully reared it until it flew. Unfortunately it had not been banded, since the experiment had been looked upon as a doubtful attempt.—Lewis O. Shelley, East Westmoreland, New Hampshire.

OUR NEW COVER PICTURE

The well-known bird artist, Mr. Frank W. Benson, the distinguished painter and etcher whose work on birds, and especially on waterfowl, has made for him an international reputation, has most generously presented to the Northeastern Bird-Banding Association a drawing of singular interest to most of its members. It shows a wind-blown bit of sand-dune coast with a Common Tern dropping down to its nest, the wings characteristically raised. To many of our members this will bring vividly back to memory arduous days of banding in tern colonies. It may be that more Common Terns have been banded by our group than any other single species of bird. Those of us who have had the privilege of visiting the sandy parts of our New England shores will especially welcome this picture, which we reproduce upon our cover in this issue, as a symbol of at least part of our activities, as a vivid reminder of the beauties of such regions, and as an artistic reproduction of one of our most graceful birds in action. The Council of the Association is sure that the members will join with it in thanking Mr. Benson for this gracious expression of his interest in our work.

FREDERICK A. SAUNDERS, *President*
Northeastern Bird-Banding Association.

LIFE HISTORIES OF NORTH AMERICAN BIRDS

We commend to the attention of the readers of BIRD BANDING the following letter from the author of that very important work "Life Histories of North American Birds," of which nine volumes have thus far been published by the Smithsonian Institution in Washington.

To our Contributors:

So many inquiries have come to the author as to when the next volume of "Life Histories" is likely to appear that it seems desirable to explain to former contributors the present status of the work.

Since Bulletin 162 on Gallinaceous Birds was published, the manuscripts for two volumes on Birds of Prey have been prepared, covering all the birds from the vultures to the owls inclusive in the order of the old Check-List. These volumes have not been published for lack of the necessary money, drastic economies in the regular governmental appropriations having required the elimination of such funds. While there is no immediate prospect of their publication, it is our hope that one at least may appear next year.

In the meantime, the author is at work on still another volume, the twelfth, which will cover all the birds in the old Check-List arrangement from the parrots to the hummingbirds inclusive.

Although some material has already come in on some of these groups, the author realizes that former contributors have not been advised as to what groups would be taken up next, so that they have not sent in as much material as they might have done.

The author is ready now to receive contributions of notes on habits, and photographs, relating to any birds in the groups indicated above. Notes relating merely to distribution or migration should be sent to the Biological Survey, where this part of the work is handled.

The assistance of our many contributors in the preparation of earlier volumes has been invaluable, and I ask that it be continued. Those who send in material suitable for use in the work will have their names placed on the mailing-list to receive future volumes.—ARTHUR CLEVELAND BENT, Taunton, Massachusetts.

A letter from William J. Lyon to Ira N. Gabrielson, Chief U. S. Bureau of Biological Survey, Proposing a Change in the Inscription on Bird Bands

Ira N. Gabrielson, Chief,
U. S. Biological Survey,
Dept. of Agriculture,
Washington, D. C.
Dear Sir:

It is my conviction that a much increased number of reported returns and recoveries would result from a change in the marking of the bands used by bird-banders under Federal permit.

Some years ago Dr. A. R. Shearer, of Mont Belview, Texas, wrote about the trouble he had had in securing the bands from birds killed for food by colored people and Mexicans. Even when he knew that a bird with a band had been taken, he found that the hunter's fear of prosecution for illegal killing prevented the delivering-up of the bands. He could get bands at last only by visiting these people frequently and obtaining their confidence.

Apparently "U. S. Biological Survey" means nothing to many hunters, and to the illegal killer, it suggests Federal prosecution. Hence I propose that, in the interest of securing the largest number of returns from the birds that are killed, the bands be stamped "Notify Box Z, Washington, D. C.," or in some similar manner.

Yours very truly,
WILLIAM I. LYON,
November 30, 1935. Inland Bird-Banding Association.

RECENT LITERATURE

(Reviews by Margaret Morse Nice)

The articles have been selected and arranged under subjects of importance to students of the living bird and also for the purpose of suggesting problems or aspects of problems to those banders who wish to make the most of their unique opportunities.

Headings in quotation marks are the exact titles of books or articles or literal translations of such titles. Other headings refer to general subjects or are abbreviated from titles in foreign languages. References to periodicals are given in italics.

BANDING AND MIGRATION STUDIES

Banding in Switzerland.[1] A. Schifferli, Jr., reports 20,681 birds banded in 1933, of which 7 species of Titmice totaled 7202, Starlings 3719, and Swallows (*Hirundo rustica*) 1140. The arrangement of data is excellent, for one can see at a glance the age of the bird when banded and recovered and the distance and direction of the place of recovery from that of banding. Many examples are given of young returning to their birthplaces. A few distant recoveries are reported for Blue Titmice (*Parus cæruleus*), 860 kilometers southwest, and Coal Titmice (*Parus ater*), 195 kilometers south. A Swallow reached the age of seven years, as did a Common Buzzard (*Buteo buteo*). Two Alpine Swifts (*Micropus m. melba*) banded as nestlings were found nesting in their birthplace eight years later.

Dutch Banding.—In the 22d report of banding results from the National Museum of National History at Leiden[2] we read that some of the Starlings (*Sturnus v. vulgaris*) that breed in Holland are permanent residents, while others winter in England. Fall visitors come from Sweden and Germany; some pass the winter in Holland, others going to England. Three birds of five years are reported and one of nine and a half. European Cormorants (*Phalacrocorax carbo sinensis*) probably do not breed until three or four years old, the sexually immature birds apparently spending the summers in their winter quarters. Ten birds reached ages of four to nearly seven years.

The Banding Station at Wassenaar[3] states that 8058 birds were banded from May, 1933, to May, 1934; 4916 of these were Starlings and 1087 Chaffinches (*Fringilla cælebs*).

Ringed Birds Recovered in Bulgaria[4]—From 1931 to 1933, 61 ringed birds from other countries were taken in Bulgaria, among them 5 Hawks, 23 White Storks, 22 Ducks, 5 Black-headed Gulls (*Larus ridibundus*), and a Gray Heron (*Ardea cinerea*) nearly seven years old that had been banded in Rumania.

"Proportionate Numbers in Relation to Age and Sex in Fall and Spring Migrants."[5]—A tabulation of the records of Common Red-starts (*Phœnicurus phœnicurus*), Blackbirds (*Turdus merula*), and Chaffinches (*Fringilla cælebs*) taken at Helgoland showed a marked preponderance of females, especially in spring. Dr. Drost says that with the two latter species some males do not migrate, but this does not explain their even greater scarcity in spring. In the Chaffinch the proportion of adults to young in the fall was 100to 256. In the Blackbirds the fall proportion was 100 to 174, and the spring proportion 100 to 105. The author suggests that this may point to a 50 per cent winter loss of adults and 70 per cent loss of young birds.

Return to Winter Quarters.[6]—The Governor of Sinai describes how a Gray Wagtail with a broken leg wintered in his garden for five years, a Black Redstart with a scalped head for four years, and a very tame Woodcock for seven years.

[1] 10. Bericht des Schweizerischen Vogelwarte Sempach. 1935. *Ornith. Beobachter*, 32, 10:155–174.
[2] Junge, G. C. A. 1935. Resultaten van het Ringonderzoek betreffende den Vogeltrek, ingesteld door het Rijksmuseum van Natuurlijke Historie te Leiden. *Ardea*, 24:166–199.
[3] Bouma, J. B., J. C. Koch en M. J. Tekke. 1935. Jaarsverlag 1933–1934 van het Ringstation Wassenaar. *Ardea*, 24:97–111.
[4] Pateff, P. 1935. Die im Ausland beringten und in Bulgarien erbeuteten Zugvögel. II. Mitteilung. *Bull. Inst. Roy. d'Hist. Nat. a Sophia, Bulgarie*, 8:172–177.
[5] Drost, R. 1935. Ueber das Zahlenverhältnis von Alter und Geschlecht auf dem Herbst-und Frühjahrszuge. *Der Vogelzug*, 6:177–182.
[6] Jarvis, C. S. 1935. When Migrating Birds Get South. *The Countryman*. Oct:97–99.

HOMING EXPERIMENTS

Three sets of experiments with winter birds have recently been published. The most ambitious ones involved the capture of 1027 birds at their roosts at Magdeburg, Germany, from January 5th to March 30th, and shipping them the same night by express to five places from 210 to 470 kilometers distant in several directions. Only one bird—a Blackbird (*Turdus merula*) (released 420 kilometers south, retaken February 2d) returned before the end of March, but 33 were reported in Magdeburg by the end of July. Quite a number of the birds stayed for varying lengths of time in the place of release, some even nesting there. These distances—126 to 282 miles—are much longer than any which other experimenters have used with birds *in winter*. The longest distance of a winter return of which I know was a Gambel Sparrow (*Zonotrichia leucophrys gambeli*) released 34 miles from home, the only one of 16 birds of four species that accomplished this feat (E. L. Sumner, Jr., and J. L. Cobb. 1928. Further Experiments in Removing Birds from Places of Banding. *Condor*, 30:317–319.)

Of 30 House Sparrows (*Passer domesticus*) released in Potsdam, 6 kilometers from the place of capture, two returned; Titmice, a Nuthatch (*Sitta europea*

homeyeri), and a Spotted Woodpecker (*Dryobates m. medius*) returned from 4 kilometers, but none from 12 kilometers.[8]

A female Chaffinch (*Fringilla cælebs*) showed great persistence in homing: taken from 20 to 30 kilometers from her home in Nice in February, she returned promptly, once making the distance of 30 kilometers (24 miles) in one day. But when released again at this same place on March 1st during a violent mistral, she was not seen again until March 17th.[9]

[7] Hilprecht, A. 1935. Heimfindeversuche mit Wintervögeln. *Der Vogelzug*, 6:188–196.
[8] Wenkel, F. 1935. Verfrachtungen an Sperlingen, Meisen und Mittelspecht. *Der Vogelzug*, 6:200–201.
[9] Mennig, S. 1935. Faculté d'Orientation chez les Oiseaux. *Le Gerfaut*, 25:138–140.

LONGEVITY

Records of longevity will be found in Numbers 1, 2, 4, and 6.

WEIGHT

Weights of birds coming to trapping stations are given by Marples[10] and Mountfort[11]. In the former paper maximum, minimum, and average figures are given on more than four hundred weighings of twenty-two species, but no differentiation is made as to sex and age. In the latter the birds are divided as to sex and age wherever possible. A Chiffchaff (*Phylloscopus c. collybita*) kept in captivity for three hours in the light lost 22.5 per cent of its weight, while another kept in the dark lost 5.29 per cent. A third paper gives the weights in pounds of 356 Geese of the *Branta canadensis* group.[12]

Other data on weight will be found in Numbers 21 and 38.

[10] Marples, Geo. 1935. Some Results of Trapping and Ringing. *British Birds*, 29:22–25.
[11] Mountfort, G. R. 1935. Variations in the Weights of Birds. *British Birds*, 29:145–148.
[12] Swenk, M. H. and P. A. Dumont. 1935. The Weights of 356 Nebraska Specimens of Geese of the *Branta canadensis* Group, formerly contained on the D. H. Talbot Collection. *Nebraska Bird Review*, 3:135–139.

LIFE HISTORY

Study of a Nesting Colony of Starlings.[13] A valuable and important paper. About 80 per cent of the breeding adult *Sturnus v. vulgaris* at a colony at Wageningen, Holland, were banded (by being trapped in the boxes) from 1932 to 1934, and all of the young from 1931 on; 124 of the 250 adults returned (49.6 per cent) and 81 (8.3 per cent) of the young. The best method of distinguishing sex is by the color of the iris, which is dark brown in the male, but in the female consists of two concentric rings, the inner brown, the outer yellowish. The nest boxes are visited by the males every month in the year and by the females every month but December, January, and July. Of the banded nestlings, 13 females bred at one year, 6 at two years; 4 males bred at one year and 15 at two years. Males may take longer to reach maturity, or their non-breeding may be due to the shortage of females. Each year there are quite a number of unmated males, some of which bred the previous year; some of these males get mates for the second brood. If a second brood is raised, the pair may stay together or they may separate; the birds do not mate permanently, and a remating a second year has occurred only once. Young females start to lay slightly later than older ones and usually lay fewer eggs; records are given for seven banded birds for two years and for four birds for three years. Young females never laid seven eggs, but there were seven cases of seven eggs among sixty sets of older females and one set of eight by a five-year-old bird that had laid seven eggs during each of the two previous years. The average size of brood raised per pair ranged between 4.2 and 4.8 birds except in two years when rats and a Carrion Crow (*Corvus corone*) preyed on the young.

The author has no explanation for the excess of males; the survival of breeding females is as good as that of males. The nestlings that returned to breed were equally divided as to sex. As to the return of the young, Dr. Kluijver believes that slightly less than half the young that survive come back to the home colony, the

others nesting elsewhere. One of his young birds was found in the breeding season forty kilometers distant. He calculates the average age of a Starling that survives to breed as three years. It is a pity that a paper of such wide interest as this should not be published in English or German.

"The Natural History of the Double-crested Cormorant (*Phalacocorax auritus auritus* **(Lesson)**)."[14] An excellent study of the biology of this colonial bird. The male selects a nest-site, and "sings" to attract a female. Birds steal material from one another's nests, and sometimes eggs are broken in the process. The monograph contains a wealth of material on many phases of the bird's life-history and economic relations and interesting observations on behavior of young in captivity.

A Nesting Study of Leach's Petrel.[15] Both sexes in this species incubate, one bird often remaining four days at a stretch. Young birds attain adult weight (40–45 grams) at about 20 days, reach 69 grams by 34 days and decline after 40 days. The incubation period of Procellariiformes is extraordinarily long in relation to the size of the eggs (see Heinroth[16]), but it is not clear why—on a basis of one record of at least 42 days—the author supposes that "in all probability incubation endures for at least 50 days," adding that "This long period has been affirmed by natives who live on the islands where the birds breed." He suggests that the "long incubation period may be correlated with the low temperature and great humidity of the burrow, and to the low body temperature of the adults (106° F.)." But Baldwin and Kendeigh[17] found that 106.3° F. was the average body temperature of female birds (of eight passeriform species) during the breeding season (p. 157). With the Storm Petrel (*Hydrobates pelagica*) R. M. Lockley[18] found the incubation period lasted 38 to 40 days and the fledging period 54–68 days, averaging 61 days.

"Mockingbird Life History Studies."[19] A continuation of the excellent observations published in *The Migrant*, 1933, 4:29–35, and reviewed in *Bird Banding* for January, 1934, and a splendid example of life-history studies with the aid of colored bands. Some of the males of *Mimus p. polyglottos* and a few females are permanent residents. "Mockingbirds choose specific areas, usually, in Tennessee, during late autumn or early spring, which they defend vigorously from their own and other species, particularly Robins, Brown Thrashers, and Cardinals." Females also hold territory in winter. A "territory establishment" ceremony is described: "The birds face each other, step backward, forward, sideways, usually ending with a sudden turn, each flying in the opposite direction on his own side." (See the Micheners' paper, *Condor*, 37, 97–140. reviewed in *Bird-Banding*, July, 1935), Both males studied—"B" and "Y"—had the same mates two seasons in succession. "Y" was zealous in feeding his young and in guarding his nest, attacking Mrs. Laskey when she appeared in the garden, while "B" showed little concern over enemies and took no share in feeding the young. "The egg laying periods were marked by some zealous singing from high perches with an occasional flight or tossing in song. 'Y' almost ceased singing when the young hatched, but 'B' sang most excitedly at that time for a few days," also singing at night.

The nest is built by both birds, but incubation is performed by the female alone. Incubation takes 12 days, fledging 10 days. Five broods were attempted by one pair during one season. Courtship and singing were greatly influenced by temperature.

"Some Nesting Habits of the Brown Thrasher."[20] Many facts are given on the nesting of *Toxostoma rufum* in Nashville, Tenn., but unfortunately no banding appears to have been done, either of adults or young. Both birds incubate, the female 64 per cent of the time during one day's observation, the male 27 per cent, but details are not given as to the length of the periods on and off the nest. The male builds almost as much as his mate on the first nest, but she builds the second nest while he cares for the young. Five to seven days are spent on first nests, and three to four days on later ones, these not being as well built as the

early nests. Incubation averaged twelve and one half days, fledging nine to thirteen days.

"Studies of the Short-billed Marsh Wren (*Cistothorus stellaris*) **in Michigan."** L. H. Walkinshaw. 1935. *Auk*, 52:362–370. Incubation lasted 14 days, fledging 12 to 14 days. The female did most of the feeding of the young, while the male "sang as many as twenty-two hours in one day."

"Temperature and Growth Studies on the Barn Swallow."[21]—Records on 34 nestlings of *Hirundo erythrogaster*. Increase of weight was most rapid between the 4th and 10th days, the maximum (about 21 grams) being reached on the 12th day, after which weight gradually decreased until, at the time of leaving the nest at 20 days, it averaged 17.5 grams. The weight of three female parents averaged 19.6 grams. Temperature-control became established at about the 9th or 10th day. Body and feather growth in a brood subjected to excessive heat beneath a tin roof appeared to be affected adversely.

"Notes on Population Problems and Territorial Habits of Chiffchaffs and Willow-Warblers."[22]—Censuses of *Phylloscopus c. collybita* and *P. t. trochilus* over eight years gave the following results: In two tracts of two hundred and three hundred acres the number of Chiffchaffs were 63 and 42, the numbers of unmated cocks 25 and 14 (40 and 30 per cent), while the percentage of success of 20 and 14 nests were 60 and 70 respectively. On the same tracts the numbers of Willow-Warblers were 90 and 53, the number of unmated cocks 18 and 23 (20 and 43 per cent), and the success of 36 and 15 nests was 86 per cent for both tracts. These percentages of unmated males are surprisingly high, but the author's methods of diagnosis carry conviction. The earlier nesting dates of the Chiffchaffs before the foliage is out renders their nests more open to predation than later nests. "Not all territories are rigid. Those of the unmated birds show every grade of fluidity, though some are very definite for given periods. The feeding territories of mated birds do not necessarily coincide with the nesting sites."

Polygamy is reported with a Red-breasted Merganser (*Mergus serrator*) on the Bird Island Schleimünde[23] and in the case of a Chaffinch (*Fringilla cælebs*) in Belgium.[24] Two instances of extra females feeding young are given for the Violet-green Swallow (*Tachycineta thalassina lepida*) in Colorado.[25]

Papers on Hawks.—In three studies of Hawks in Holland and Germany the male was observed to do all the hunting for his mate and young. The species were Hobby (*Falco subbuteo*),[26] Sparrow Hawk (*Accipiter n. nisus*)[27] and Kite (*Milvus m. milvus*).[28] The island Signilskär is a stopping-place for many transients, but it has little cover on it; the majority of birds killed there by *Accipiter nisus* have red in their plumage—Chaffinches, Bullfinches, Redstarts, and Redbreasts. The Vogelwarte believes this is due to the conspicuousness of these birds in this particular environment.[29]

In an excellent paper on the ecology and nest life of Marsh Hawks (*Circus hudsonius*) in Minnesota[30] we learn that pairs may nest as near as two hundred yards to each other, that incubation lasts 30 to 32 days, and is performed by the female; that the male caught 80 per cent of the food for the young and transferred it to his mate in the air; and that if in her absence he brought it to the nest, he appeared not to notice the young. The number of feedings per day increased from four at the age of 8 days to 24 at 23 days, but dropped to 18 at 30 days and to 8 at 34 days. The young began to fly at about 5 to 6 weeks of age and could catch food in the air dropped by the parents when 7 to 8 weeks old.

A young male prairie Falcon (*Falco mexicanus*) taken from the nest and raised by hand became an affectionate and interesting pet.[31]

Papers on Storks.—The problem of sexual maturity in the White Stork is discussed by Steinbacher[32] and Schüz,[33] the latter reviewing the literature on the subject of the age at which this bird begins to breed, finding that it usually does so

when three or four years old, but that there have been two cases of breeding at two years of age, one bird being a female, the sex of the other being undetermined.

The recent increase in the numbers of breeding Storks is discussed in three papers. In Saxony there has been a rapid rise since 1928; the average number of young raised per year per pair has ranged from 2.6 to 3.58, during 1933 and 1934 being 3.01.[34] In Schleswig-Holstein there was a rapid decrease from 1907 to 1930, and a rapid increase since then. The average number of young raised per pair was 2.6 in 1925 and 2.4 in 1930 and 1934. In 1925 twelve per cent of the pairs raised no young, but during 1930 and 1934 the percentage was fourteen.[35] In Bavaria the number raised per pair in the very wet, cool season of 1933 was 2.7, and in the extraordinarily dry season of 1934, 2.84. In the former year 10.6 per cent of the pairs raised no young, in the latter 15 per cent, but this loss was offset by the fact that 44 of the 119 pairs raised 4 young apiece (33 raising 3 young), whereas in 1933 three young were raised by 36 of the 113 pairs and four young by 32 pairs. One pair in 1934 raised 6 young![36]

[13] Kluijver, H. N. 1935. Waarnemingen over de Levenswijze van den Spreeuw (*Sturnus v. vulgaris* L.) met Behulp van Geringde Individuen. *Ardea*, 24:133–166.

[14] Lewis, H. F. 1929. Ottawa, Ru-Mi-Lu Books. 94 p. 75c.

[15] Gross, William A. O. 1935. The Life History Cycle of Leach's Petrel (*Oceanodroma leucorhoa leucorhoa*) on the Outer Sea Islands of the Bay of Fundy. *Auk*, 62:382–400.

[16] Heinroth, O. 1922. Die Beziehungen zwischen Vogelgewicht, Eigewicht, Gelegegewicht und Brutdauer. *Journal für Ornithologie*, 70:172–285.

[17] Physiology of the Temperature of Birds. 1932. Scientific Pub. Cleveland Mus. Nat. Hist. III. 196 p.

[18] On the Breeding Habits of the Storm-Petrel, with Special Reference to its Incubation and Fledging-Periods. 1932. *British Birds*, 25:206–211.

[19] Laskey, A. R. 1935. *Auk*, 62:370–382.

[20] Erwin, W. G. 1935. *Jour. Tennessee Acad. Science*, 10:179–204.

[21] Stoner, D. 1935. *Auk*, 62:400–408.

[22] Price, M. P. 1935. *British Birds*, 29:158–166.

[23] Ringleben, H. 1935. Polyandrie und Polygynie bei *Mergus serrator*. *Ornithologische Monatsberichte*, 43:148.

[24] Van Benedin, A. 1935. Elevage des Jeunes Oiseaux par des Nourriciers étrangers. *Le Gerfaut*, 25:40–41.

[25] Shirling, A. E. 1935. Observations on the Violet-green Swallow. *Wilson Bulletin*, 42:192–194.

[26] Tinbergen, N. 1935. Een Boomvalknest. *De Levende Natuur*, 40:143–150.

[27] Tinbergen, L. 1935. Waarnemingen bij een Nest van de Sperwer (*Accipiter n. nisus* (L.)). *Ardea*, 24:67–86.

[28] Thiele G. u. A. Zänkert. 1935. Aus dem Brutleben des Roten Milans. *Beiträge Fortpflanzungsbiologie der Vögel*, 11:121–129, 169–173.

[29] Nordberg, S. 1935. Zur Ernährungsbiologie des Sperbers, *Accipiter n. nisus* (L.), während der Zugzeit. *Ornis Fennica*, 12:65–71.

[30] Breckenbridge, W. J. 1935. An Ecological Study of Some Minnesota Marsh Hawks. *Condor*, 37:268–276.

[31] Pierce, W. M. 1935. Experiences with Prairie Falcons. *Condor*, 37:225–230.

[32] Steinbacher, J. 1935. Ricerche sulle Gonadi della Cicogna Bianca. *Rassegna Faunistica*, 2:3–15.

[33] Schüz, E. 1935. Riconoscimento dell'Eta delle Cicogne che Covano. *Rassegna Faunistica*, 2:16–23.

[34] Zimmermann, R. u. W. Scholze. 1934. Das Vorkommen des Weissen Storches, *Ciconia c. ciconia* L., in Sachsen und die Wiederzunahme seines Bestandes seit 1928. *Mitt. Vereins sächsicher Ornithologen*, 4:147–174.

[35] Emeis, W. 1935. Bestandsschwankungen und heutige Verbreitung des Weissen Storches in Schleswig-Holstein. *Journal für Ornithologie*, 83:588–601.

[36] Dietz, J. 1935. Der Weisse Storch als Brutvogel im Rechtsrheinischen Bayern in den Jahren 1933 und 1934. *Verh. Ornithologischen Gesellschaft in Bayern*, 20:538–562.

TERRITORY

Territorial Behavior in the Wood Warbler (*Phylloscopus sibilatrix*).[37] After the arrival of a mate the male restricts his activities to a smaller territory than before but defends it more vigorously, driving out *all* other birds—Warbler, Titmouse, or Woodpecker. "Il ne permet à aucun autre oiseau, Pouillot, Mésange ou Pic, de traverser ces nouvelles frontieres." Before he gets a mate he sings at intervals of 25 seconds to 2 minutes, but afterwards at intervals of 4 to 10 minutes. His first song advertises his want of a mate, his second announces that the territory is occupied.

The Meadow Pipit (*Anthus pratensis*) often nests in little colonies in Brittany and has no territory. In late February and early March two or three males follow

a female as she feeds and later fight each other in the air. "The possession of the female is the sole motive and these disputes never take on the character of the defense of a chosen territory." The earliest sets contain 4 eggs, later ones 5 eggs. The weight of 20 nests ranged from 4 to 13.5 grams.

"Bush-Tits 'Shadow-Boxing'." J. M. Robertson, 1935. *Condor*, 37 : 257–258. Both male and female *Psaltriparus m. minimus* fought their reflections in a window one hundred feet from their nest. "The instinct to defend the selected territory during the nesting period must predominate over the instinct to flock together that is so conspicuous a part of the behavior of these birds during the rest of the year."

Further data on territory will be found in Numbers 13, 14, 19, 22, 30, 39, 40, and 41.

[37] Mountfort, G. R. 1935. Manifestations Visibles du Développement Sexuel des Oiseaux *L'Oiseau et La Revue française d'Ornithologie*, 5:494–505.

[38] Lebeurier, E. et Rapine, J. 1935. Ornithologie de la Basse-Bretagne. Anthus pratensis L. 58. Le Pipit des Prés *L'Oiseau et Le Revue française d'Ornithologie*, 5:462–480.

BIRD BEHAVIOR

"The Courtship of Gould's Manakin (*Manacus vitellinus vitellinus*) **on Barro Colorado Island, Canal Zone."**[39] Dr. Chapman gives a vivid picture of strange courtship patterns in an important paper that should be read in full by all students of bird behavior. "The manakins (family Pipridæ) are small, passerine birds inhabiting the American tropics and subtropics." As a group "they possess notable courtship behavior which in the physically better equipped species becomes complex, coöperative, and well organized." The breeding season of Gould's Manakin lasts for eight months; it is inaugurated by the gathering of the males at their "courts," five to seven of which, situated about thirty to forty feet from each other, "constitute a group or *lek*." The court is a "small space on the forest floor, from which the male removes all loose material. This at once becomes the focal point of his life; to induce the female to visit him in court for the purpose of mating now becomes the chief object of his existence." "The vocal powers of the males are limited and, to announce the location of their courts to the females, they produce with their wing-feathers loud snapping and whirring sounds which can be heard at surprising distances. With rare, and generally explicable, exceptions territorial rights are rigidly observed." Every two or three hours the male leaves his court for a few minutes to get his food which consists of berries. The males "appear to be on peaceful terms with each other. During periods of inactivity, owners of adjoining courts may perch side by side." Very interesting "submissive-dominant" relations were observed between neighboring males. Upon the arrival of a female all the males enter their courts. "Simultaneously they whirr, snap while jumping around and across court, and perform a variety of acrobatic feats, all designed to attract the attention of the female." Experiments with stuffed birds showed that the male courted the female and sometimes attempted coition, while a stuffed male placed in or near a court was attacked with fury.

The Courtship of the Capercaillie.[40] Much on the same order as that of the gay little Manakin, but with far less time devoted to it, is the courtship of the great *Tetrao urogallus*, as carefully observed by two French ornithologists in the Alps, their paper being illustrated with striking sketches. The males gather at *leks*, crow, and leap in the air, beating their wings, all the cocks leaping simultaneously. Each defends his "mating territory," primarily by intimidating postures, the authors never observing any fights. The female watches from a tree, from which she descends to join one of the males.

The Courtship of the Red-necked Phalarope.[41] Careful, detailed studies of the territorial, mating, and egg-laying behavior of a particular *Phalaropus lobatus*.* The female arrives before the male, and takes up a territory, which she defends—although not very vigorously—from other females of the species. She

advertises her presence by a ceremonial flight and special call or song, indulging in it "every five minutes for several hours," until she attaches a mate, whereupon she becomes silent. Both birds made "scrapes," sometimes alone but more often together. When ready to lay, the female gave her ceremonial flight and song once more and was closely followed by the male. The males took complete charge of incubation and care of the young. Excellent discussions follow on the function of color in plumage, "supposed polyandry," "discrimination of the other sex," and other phases of bird-behavior. A valuable paper that deserves to be widely read.

"Parental Instincts in Black Phoebes." E. C. Kinsey. 1935. *Condor*, 277–278. A pair of *Sayornis nigricans* accepted newly hatched young in place of fresh eggs; another accepted young ready to leave the nest in place of newly hatched birds, while a third pair accepted partly grown young in place of slightly incubated eggs. In all these cases the cycle was advanced. A fourth pair accepted young several days old in place of young ready to leave, but when eggs were given to the birds that had young several days old, the nest was deserted.

The book on "Sea Terns or Sea Swallows" reviewed below contains much material on bird-behavior; see also Numbers 14, 19, and 31.

* This species is the Northern Phalarope (*Lobipes lobatus*) of the A. O. U. *Check-List*.
[39] Chapman, F. M. 1935. Bull. American Museum Natural History, 78:471–525.
[40] Hainard, R. et O. Meylan. 1935. Notes sur le Grand Tétras. *Alauda*, III, 7:282–327.
[41] Tinbergen, N. 1935. Field Observations of East Greenland Birds. I. The Behaviour of the Red-necked Phalarope (*Phalaropus lobatus* L.) in Spring. *Ardea*, 24:1–42.

POPULATION THEORIES

"On the Dynamics of Populations of Vertebrates."[42] Severtzoff believes that populations are always striving to increase to a maximum, whereupon they are decimated by a "plague," which may be abiotic—cold, floods, drought, etc., or which may be epidemic disease. He contends that "the coefficients of the periodic reproduction and of the dying off of the population must be specific for each species and must correspond to the potential fertility and to the mortality rate of that species between two plagues." "This shows the utter impossibility of admitting a simple periodicity in the mass reproduction of different species, connecting it with the periodicity of climatic fluctuations, resulting from the eleven-year cycle of sunspots."

In this and another paper[43] the author gives figures on fluctuations in various game populations, and he concludes that mammals lose 50 per cent of the total young born, while only 10 per cent of birds hatched reach maturity. Although these last generalizations are too sweeping, his point of view is suggestive and the papers are well worth reading.

"Wildlife Cycles in Relation to the Sun."[44] Cycles in populations and in migration are illustrated by means of smoothed curves. The paper is not convincing to the reviewer.

"Solar Radiation and Weather Studies." C. G. Abbot, 1935. Smithsonian Mis. Collection, Washington, D.C. 94 (10). 89 p. Basic data on periodicity in solar phenomena.

"Over-populations and Predation. A Research Field of Singular Promise." P. L. Errington, 1935. *Condor*, 37: 230–232. This brief, suggestive paper points out many vital questions in the matter of predation in relation to populations and over-populations, showing how little we really know in this field.

[42] Severtzoff, S. A. 1934. *Quarterly Review of Biology*, 9:409–437.
[43] 1934. Vom Massenwechsel bei den Wildtieren. *Biol. Zent.* 54, 7/8, 337–364.
[44] L. W. Wing. 1935. *Trans. 21st American Game Conference*: 345–363.

BOOKS

"Fauna of the National Parks of the United States."—George M. Wright, J. S. Dixon, and B. H. Thompson. 1933. Wild Life Survey, Fauna Series No. 1. 157 p. 20 cents. An excellent little book treating the faunal problems of each park, and concluding with twenty admirable suggestions for National Park Policies, three of the most interesting being:

"That the rare predators shall be considered special charges of the national parks in proportion that they are persecuted everywhere else. That no native predator shall be destroyed on account of its normal utilization of any other park animal, excepting if that animal is in immediate danger of extermination, and then only if the predator is not itself a vanishing form. That species predatory upon fish shall be allowed to continue in normal numbers and to share normally in the benefits of fish culture."

"Michigan Waterfowl Management."—M. D. Pirnie. 1935. Department Conservation; Game Division, Lansing, Mich. 328 p. $1.50. A most practical handbook, amply illustrated and with headings and summaries in heavy black type. The first part treats of waterfowl conditions and problems in Michigan, while the second deals with Wildlife Management and the Waterfowl Program with chapters on Laws and Regulations, Refuges, Duck Foods and Planting, Propagation and Restocking, Predator Control, a Management Calendar, and Restoration. The only suggestion for improvement occurring to the reviewer would have been a final chapter summarizing general principles.

"The Bird Book."—Neltje Blanchan. 1932. Doubleday, Doran & Co. Garden City, N.Y. 498 p. $2.95. This is a reprint of the familiar "Bird Neighbors" and "Birds that Hunt and are Hunted" with the addition of colored plates by Nellie Fairpoint. The text has considerable charm and is well calculated to arouse interest in the beginner, although the arrangement of the biographies in the first part of the book according to the *color of the bird* is confusing, to say the least. As to the colored plates they are a decided detriment to the book, the pictures being unbelievably bad.

"Bird and Animal Paintings."—R. Bruce and Carra E. Horsfall. Nature Magazine, Washington, D. C. 58 p. $1.50. These colored plates and brief biographies of some one hundred fifty birds and mammals chosen from all over the country are well adapted to interesting children in nature.

"Birds of the States."—R. Bruce and Carra Horsfall. Nature Magazine, Washington, D. C. 50 cents. Illustrations and brief biographies of the thirty species that have been chosen as "State Birds," with an account of the campaigns of election, such campaigns being considered as possessing definite educational value.

"Sea Terns or Sea Swallows; Their Habits, Language, Arrival and Departure."—George and Anne Marples. 1934. Country Life, London. 228 pages. 15s. This large and handsomely got up monograph, illustrated with beautiful photographs, is concerned partly with the status of different species of Terns on the British Isles, but mostly with observations on their life-history. Five species are considered: Sandwich (*Sterna s. sandvicensis*) and Little Tern (*S. a. albifrons*), and the Common (*S. h. hirundo*), Arctic (*S. macrura—paradisæa*), and Roseate (*S. d. dougalli*) Terns, these last three nesting on both sides of the Atlantic. Many experiments were carried out in exchanging eggs between different nests, in changing the surroundings of the nests, moving eggs, and painting them different colors. Although there were specific and individual differences, the birds on the whole were found remarkably tolerant of changes and fairly well able to cope with new situations. The value of these interesting experiments would have been greater if the authors had summarized their findings and also compared them with the work of other investigators. The book makes a distinct contribution to the subject of bird-behavior and will prove especially interesting to banders in America and other countries who have worked with Terns.

"The American Eagle. A Study in Natural and Civil History." Francis H. Herrick. 1934. Appleton-Century Company, New York. 267 pages. $3.50. A notable book on the Bald Eagle (*Haliæetus leucocephalus*) which has been the subject of the admirable studies of the author for many years. All phases of the bird's life-history are treated, chiefly from knowledge gained by long hours of watching from the observation tower, but also from experiments with hatching eggs and raising young in the laboratory, and finally from a wide acquaintance with the literature on eagles. The last part of the volume is concerned with the "Eagle as Emblem" from the times of earliest history to the present. The book is well written and well illustrated, and shows Dr. Herrick both as tireless and resourceful investigator in the field and as scholar. "The American Eagle" deserves the widest circulation; copies should be given by Audubon Societies and individuals to schools and libraries and camps, for they surely will enlist enthusiasm for this noble bird and his kin.

"Birds and the Sea."—Frances Pitt. 1935. Longmans, Green & Co., London, and New York. $2.50. In this delightful book Miss Pitt tells of experiences at the wonderful Gannet colony of Grassholm; of long tramps in the rain to view a Heron colony nesting on cliffs in the Orkneys—the large stick-built nests "somehow or other safely lodged on the ledges;" the placid fearless Eider Ducks on the Farne Islands, where they are called "St. Cuthbert's Ducks;" the pet Raven now nearly twenty-four years of age; and fascinating accounts of adventures at Skokholm with Storm Petrels and Manx Shearwaters. "Fully fledged young shearwaters, replicas of their parents save for a few shreds of down, sat pathetically on their rabbit-hole doorsteps, waiting for parents that came no more but had left them to shoulder their own fate." A most attractive book, richly illustrated with admirable photographs taken by the author.

"Singing in the Wilderness. A Salute to John James Audubon."—Donald C. Peattie. 1935. G. P. Putnam's Sons, New York. 245 pages. $2.50. A wholly fascinating book beautifully written by a naturalist and artist out of great sympathy for his hero based on "a love of what he stood for, as Frenchman, American, artist, loafer, wanderer, lover, bird-hearted observer." In his reconstruction of the story of John and Lucy Audubon one feels that the author has captured the true spirit of these two.

The book has many illuminating passages on man and nature. "Nothing ever really happened to him except birds, for he took nothing else seriously. Even his love affair, his marriage and his home were as those of the birds—a mating for life, a nesting here and there, a foraging by God's grace, a wide roaming and a sure return."

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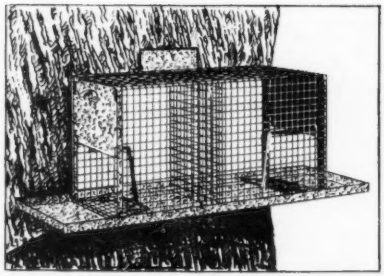

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